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LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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Editorial Notes.

Cardiff Anticipations.

THE next big event to which the members of the gas profession are looking forward is the annual meeting of the Institution at Cardiff; and the city and Wales generally are preparing for a welcome which will be genuinely thorough and whole-hearted. The Principality and its gas professionals feel honoured that Mr. H. D. Madden, M.Inst.C.E., is this year's President of the Institution, and that Cardiff has been chosen for the annual meeting. In the result, we shall have it proved that, though London has supreme attractions and conveniences for an annual meeting, it is as well at intervals to break away from it, and from arrangements which are apt to become conventional, and to cloy some of the older members. An occasional change of scene and plans serves to correct this. And so we welcome, and so do many members, the alteration we are to have this year, and the enjoyment of that fine hospitality of Cardiff which always awaits any visiting organization whose objective is the advancement of public service through the process of scientific development. We have yet to receive the full details of the plans that are being laid by the Reception Committee, consisting of the Council of the Wales and Monmouthshire District Institution of Gas Engineers, of which Mr. Octavius Thomas is the Hon. Secretary. But the outline of the programme which we published last week lifts the curtain sufficiently to inform us that the preparations are in good hands, and that the co-operation between all concerned—including the progressive Board of the Company of which the President is the executive chief—will offer to the members finished plans for their comfort and enjoyment, which will ensure the visit and Mr. Madden's year of office being memorable. The Lord Mayor and the Lady Mayoress have graciously invited the members and their ladies to a dance and reception in the City Hall; and the South Wales Institute of Engineers are placing the conveniences of their official home (which is close to Cory Hall where the meetings will be held) at the service of the visitors. This is kindness which will be found of great value. There will be visits to the gas-works, to steel-works, docks, &c., and an excursion on the Friday. The ladies are not going to be allowed to wander about in a strange land unentertained during the sittings of the members. The Reception Committee are looking after that; and of their proposals we shall hear more anon.

All this, however, is, metaphorically speaking, the halo round the sun. The technical proceedings are the matters of central importance; and it can at once be said that variety and interest will be of the first order. The Council are introducing new plans for the conduct of the sittings which will extend the range of topics, present them in essence, and allow the maximum time for discussion. If those who take part in the debates will aid and abet the Council in their design to get the highest quality and thus good out of the proceedings by avoiding generalities, and giving in essence or without redundance their views or experiences regarding the subject in hand, the intent of innovation will be realized. The President, of course, will deliver his Presidential Address *in extenso;* and with the range of capital experience and work that he has had, the members are bound to find in it much that is interesting and valuable in guidance. Regarding the papers, they will be presented at the meeting in abstract only, though the plans of the Council enact that they shall be ready for distribution a month before the opening of the meeting. To comply with this arrangement, the authors will have to prepare and have ready for the printers their MSS. and illustrations much before that time; otherwise there will be disappointment. Their loyal collaboration in giving effect to the arrangements is therefore highly important. Speaking of the papers, we are confident the members will unanimously confirm the award of the "H. E. Jones London Medal" to Mr. Thomas Carmichael for his contribution to last year's meeting on "Modern Carbonizing Economics, as Exemplified by Results and Working Costs at the Works of the Portsmouth Gas Company." On the coming occasion members will be invited by Mr. Harold Hollings, M.Sc., Chief Gas Chemist of the Gas Light and Coke Company, to consider "Some Applications of Chemistry to Gas Making." Works engineering will have its representation in a paper, by Mr. W. H. Johns, on "The New Morriston Works of the Swansea Gas Company," of which he is the Engineer. There will be a little diversion and orientation when Mr. Stanley B. Johnson, Engineer of the Colombo Gas Company, dilates on "Gas Supply East of Suez." Mr. Johnson will have a hearty welcome from his professional fellows. There will be two papers on distribution—one by Mr. Stephen Lacey, B.Sc., of the Gas Light and Coke Company, on "Economic Aspects of High-Pressure Distribution;" and the other by Mr. Harold C. Smith, M.Inst.C.E., on "Distribution at Tottenham," in which he will describe some recent alterations and extensions.

There is a long list of reports and other Technical communications to be made; but, like the papers, they will be epitomized. There are the reports of the Education Committee, Research Fellowship, Gasholder Construction and Deterioration Committee, Joint Refractory Materials Committee, Wrought-Iron Tubing Research Committee, and of the Committee dealing with the "Employment of Gas for Therapeutical Purposes." The Nineteenth and Twentieth Reports of the Gas Investigation Committee will be presented—the one dealing with "Products of Combustion of Typical Gas Appliances," and

the other with "Studies in Carbonization." These will show further penetration into their important subjects. The one treating of carbonization is on the captivating question of the influence of temperature, and the size of coal and admixture of sizes, and additions of coke breeze and inorganic compounds. Representatives on Committees and delegates to conferences of other bodies will also give an account of the results of their deputizing. There will be much of interest in all this.

We foresee a meeting at Cardiff which will be healthy and fruitful on the technical side, while interspersed with social engagements that will give a full measure of pleasure. The programme and the preparations warrant the prophecy. June 12 to 15 are dates that for most professional gas engineers will be kept free from all other engagements.

Economic Value of Modernization.

It is only natural that work which has called for a large amount of concentration by a responsible gas engineer should be paramount in mind when he is considering the material which should compose a Presidential Address to his professional peers. This was the case with Mr. R. H. Ginman, of Leek, when he came to prepare the address with which, last Friday, he inaugurated his year of presidency of the Manchester District Institution of Gas Engineers. The past few years he has been engaged in superseding his old carbonization plant by new, and in many other ways has changed the organic conditions of his works, and thus of his operations. Of all this change, he gave an account in his address. But the deliverance is something more than a description of what has been done, and the effects realized. It is a case illustrating the economic value of reconstruction on modern lines, though the works may only produce 174 million c.ft. per annum, to which the make has ascended from 116 million c.ft. in 1914, or an increase of 50 p.ct. The capacity is therefore on lines which will cause the address to interest a large number of gas engineers who are somewhat similarly circumstanced.

Mr. Ginman is philosophic. With him it is only waste of time to consider what would have been, had all the new work been carried out in pre-war days at the prices then ruling, apart from the fact that the then existing plant was hardly ripe for scrapping. But those who are minded to make comparisons between pre-war prices for structural work and those now obtaining must not take the bare capital costs as compassing the whole story. We were taught years ago that there was often economic value in higher capital expenditure. In the case, for example, of carbonizing plant, the difference between the cost per unit in 1914 and (say) a dozen years later or now is not all loss. The intervening years have been fruitful in their revelations, and have added to operating economy and efficiency. We know more now than then as to the requirements of to-day and the probabilities of the morrow. Therefore, some of the additional capital expenditure is represented by increased value. Per unit of production, too, labour costs are not now what they were. In the case of Leek, with the old inclined retort-settings, a fairly heavy—for such size of works—annual expenditure on repairs and renewals was incurred; and this has been substantially wiped out by the new plant. Thus comparison of the effects between the capital expenditure of 1914 and that of latter years should take place not at capital charges only but much beyond them. With coal costing 15s. 10·23d. per ton in 1913-14 and 26s. 1·75d. in 1925-26, or 10s. 3·52d. more, that the net cost of gas in the holders should not be, with salaries, wages, maintenance, and everything up, more than 3·51d. per 1000 c.ft. greater than in 1913-14 is testimony to the more efficient working by the new plant, and to the increased value there is in the higher capital expenditure..

The problems with which Mr. Ginman has had to contend since the war, during which the plant was showing signs of deficiency in capacity, or advancing age, and incongruity with modern efficiency—especially the inclined retorts—have all been successively and successfully met and solved, and the town now possesses a gas plant equal to requirements and possessing an excellent flexibility for all emergencies. The work commenced with the purchase of land, and proceeded to the erection of an exhauster, the construction of a spiral-guided holder, a new valve-house, and all the accessories for improving the delivery of gas to the district. The whole of this work and its incorporation into the manufacturing system, despite considerable difficulties, was carried out without in any way inconveniencing the consumers. We congratulate the President. There came the important consideration of new carbonizing plant, with its higher scale of financial obligations compared with those that obtained when the inclined retort plant was constructed—not only the inevitably higher initial cost, but the enhanced rate of interest on the necessary loans. But there were aspects of the position which were fortunate. They were the low amount of the outstanding pre-war loans, the sound financial basis of the undertaking, and its increasing prosperity. It was, however, "absolutely necessary so to plan the reconstructions as to secure such great economies in future working, especially in labour charges, as to counterbalance the enhanced cost of the new work, and thus avoid both high charges to the consumers and a hampering burden of debt to the Council." In this, it can be said, there has been success.

The details of the Glover-West installation with the accessory plant—water-tube condensers, new boiler-house with setting for the existing Cornish horizontal boiler and a new gas-fired Spencer-Bonecourt auxiliary boiler, a new exhauster-house, water-storage tank, &c.—are given in the address. There was quick work on the part of the contractors. In February, 1924, the demolition of three-eighths of the inclined retorts was begun; by Nov. 10, the first section of the vertical retorts was in operation, and four days later the inclined retorts were shut down, never to be again used. And this included the critical work of reorganizing the works mains, introducing the new condensers, and the removal of the exhausters to the new position. The saving of ground space by vertical retorts is demonstrated. The new plant is in a house originally designed for the production of 1 million c.ft. of gas; it now contains a plant equal to 1¼ million c.ft., and eventually an additional eight retorts will be added which will raise the productive capacity to 1¾ millions. The contractors were on the safe side with their guarantees. The first section of the installation was guaranteed to produce 720,000 c.ft. of gas per day of a calorific value of 460 B.Th.U. gross. The make in twenty-four hours has been 860,000 c.ft. of the calorific value named, which means that while the guarantee was 3312 therms, the make has been 3956 therms, or 644 therms more—nearly 20 p.ct. above the guarantee. In this there is a good margin of safety for the contractors. According to Table "A" in the Appendix to the address, pre-war the make per ton with inclines was 11,350 c.ft.; in 1925-26 with verticals, 19,013 c.ft. The amount of coke and breeze available for sale pre-war was 8·2 cwt., and in 1925-26 7·1 cwt.—this difference being partly due to steaming and partly to the fact that the coke is dry. The point of greatest interest, however, is that the therm production by the verticals is 87·46 per ton of coal.

The address proves the economic value of the modernization of the plant at Leek. Mr. Ginman and his Committee are to be congratulated upon the technical care and foresight and the commercial and administrative acumen that have done so much to increase the economic stability and operating efficiency of the concern. We should also compliment them upon the popular sliding-scale tariff for gas, and upon the excellent trading position which they have cultivated for the concern in respect of coke. The breaking, screening, and grading of the coke were taken in hand, and a set effort made to create demand. The undertaking is in the happy position of being able to dispose of all its production; but in this the quality of the coke is an important factor. In choosing coal, the necessity of producing a good coke is borne in mind, and the vertical retort coke is dry, of open texture, and burns easily. Coke dumpers at lower prices are warned. Leek consumers have become accustomed to the vertical retort coke—coke which does not suffer from high moisture and ash content, and has good ignitability. They recognize anything that is not up to the same standards, and will not have it. That is as things should be.

Sunlight and the Ideal Home.

FOLLOWING immediately upon the Gas Section at the British Industries Fair at Birmingham with its splendid illustration of the vitality of gas, there comes the Ideal Home Exhibition at Olympia, which this year has greater spectacular and demonstrative features than ever. The Exhibition makes a feature of the beneficent effect of sunlight on health. We have it in "Sunbeam Town." That is excellent; but sunlight, though beneficial to health, has its volume and effects largely degraded by the handiwork of man in providing for heating by means which does its best to curtain-off the sun's rays by smoke. At the very season of the year when we could best do with the maximum work of the sun, man foolishly does his utmost to produce the foul screen. There is new knowledge on this subject—knowledge which is constantly spreading. The gas industry is doing its good part in enlightening the people, and showing them ways whereby they can obtain all the heat required, and yet not obstruct Nature's provision of sunlight which contributes so bountifully to the health, work, and pleasures of humanity.

In "Sunbeam Town," we have practical application of scientific discoveries in relation to the effect of sunlight on health. In "Sun-Trap" House—which has been designed with the view of getting every possible ray of sunshine throughout the day in the principal rooms, and is glazed with "Vita" glass—we have an exposition of how a home can be run smokelessly, and so without interfering with the work of Nature. The South Metropolitan Gas Company are giving demonstrations here of how a house fitted with their "gas and coke home service" can have all its heating done, whatever the purpose, with the maximum of comfort and convenience, and without subscribing to unsatisfactory conditions outside it. "Our gas and coke service" is a telling wrinkle for propaganda work. The popularity of the coke-boiler is beyond question; and we have good experience now which shows that there is big business to be done in the use of coke-boilers not only for water heating, but in combination with radiators for house-heating purposes, with gas-fires in the rooms to supplement the temperature as and when required. It is an economical and efficient arrangement, and is gaining ground, though in "Sun-Trap" House the heating is direct by a coke fire and gas fires, while coke is used in a boiler for hot water supply.

The Joint Gas Exhibit of the seven London Companies—Gas Light and Coke, South Metropolitan, Commercial, South Suburban, Tottenham, Wandsworth, and Croydon—is a conspicuously successful portrayal of the domestic applications of gas and coke. Externally it is symbolic of the Englishman's home being his castle, though latterly we have seen that some municipal housing authorities, with electricity undertakings in the background to which they wish to extend the favour of a monopoly on their estates, have tried to undermine this ancient and cherished belief. Nevertheless, whatever electricity owning authorities with housing powers are tempted to do in trying to deprive Englishmen of their rights, their tenants are not disposed to allow any violation to go unchallenged. In this Joint Exhibit, the householder and his wife are shown how things should be done with gas and coke as agents for lighting, heating, cooking, and hot-water supply, and for greenhouse and garage purposes. About the staging and the display more can be learned in our detailed notice in other columns. Gracefulness and utility are combined in a way which cannot fail to excite admiration. Two interesting features are a special lamp for providing tuberculosis sufferers with heat rays derived from gas burning on the surface of radiating materials; and an invention which eliminates the need of batteries for wireless sets—the heat of a small gas burner being used to produce electrical energy by means described in our report. It seems to us that gas refuses to be kept out of any new field—at all events, it declines to be shut out of any new field until it is proved that it has no legitimate place.

There are displays at Olympia by manufacturers of gas appliances for heating, cooking, and water supply, though there is not a great number. But quality of goods, appearance, and performance are seen under just those conditions which carry proof that our commodities are essentials in the Ideal Home.

Analysis of the London Companies' Accounts.

IN this issue we publish the instructive analysis made by Mr. F. J. Bradfield, General Manager and Secretary of the Commercial Gas Company, of the annual accounts of the London Gas Companies. This publication has been made year by year over a long period; but hitherto the analysis has been rendered at per therm and at per 1000 c.ft. sold. Now Mr. Bradfield is of opinion that for the London Companies, being on the therm basis, the volumetric analysis may be finally discarded. We agree, seeing that all comparative use at per 1000 c.ft. is shattered by the difference in the declared calorific value of the gas, ranging in the case of the seven Companies dealt with from 470 to 560 B.Th.U. per c.ft. In the "JOURNAL" for March 2 last year, the analysis was given of the figures for the coal-stoppage year, with its heavy inflictions of high-priced coal from abroad and coal of varying characteristics and productive qualities. There was a quantity of that coal to be worked off last year; and, of course, it had some effect upon costs and returns. But otherwise the year progressively became fairly normal, except in respect of vagarious weather, which did not give any long spells of cold to provoke a good demand for heating purposes. However, there were small percentage increases in consumption, which, translated into volume, were fairly considerable. Comparing the analyses for 1926 and 1927, there is also satisfaction in the improved gas-therm production per ton of coal. Generally speaking, the average gross cost of coal was approximately 5s. per ton less in 1927 than in the preceding year, though in two or three cases the difference was round about 9s. less. On the other hand, coke receded, as expected with the return of British coal to the market, by from 4s. 5d. up to between 9s. and 10s. per ton. The average net cost for coal, oil, &c., stood in 1927 and 1926 as follows per therm sold: Gas Light and Coke, 2·50d. and 2·85d. respectively; South Metropolitan, 1·79d. and 2·41d.; Commercial, 1·42d. and 2·18d.; South Suburban, 2·5d. and 3·94d.; Wandsworth, 2·54d. and 3·15d.; Tottenham, 2·88d. and 3·89d.; and Croydon, 3·43d. and 3·88d. Naturally there was a notable change in the percentage of water gas made in the two years. On total make, the proportion of water gas in the case of the Gas Light and Coke Company was 40·2 p.ct. in 1926, compared with 28·22 p.ct. in 1927; Commercial, 22·61 p.ct. in 1926, and 10·67 p.ct. in 1927; South Suburban, 29·10 p.ct. in 1926, and 24·64 p.ct. in 1927; Wandsworth, 21·84 p.ct. in 1926, and 12·98 p.ct. in 1927; Tottenham, 38·61 p.ct. in 1926, and 26·54 p.ct. in 1927; and Croydon, 41·74 p.ct. in 1926, and 28·95 p.ct. in 1927. As the percentages are averages for the whole year, we may be sure that, as the coal stoppage had a duration of seven months out of the twelve, during that period of 1926 the percentages sometimes ran above the high average figures quoted. The gas-oil people should note the lower proportions of carburetted water gas made in 1927, and especially the modest figures of 10·67 p.ct. and 12·98 p.ct., and consider how far they themselves have contributed to this descent. In the line "percentage of stoves at rental to consumers," the South Suburban Company still take the lead with 116; the South Metropolitan Company comes next with 114; Commercial third with 101; Croydon fourth with 100; Gas Light and Coke Company fifth with 95; Wandsworth sixth with 93; and Tottenham seventh with 87. This year has not started with the same handicaps as 1927; and next year, when we have Mr. Bradfield's analysis, we hope to have figures showing good progress on what may be regarded as about normal conditions.

Coal Carbonization Conference Discussions.

In this issue we commence the publication, as a Supplement to the "JOURNAL," of the discussions at the Coal Carbonization Conference, as revised by the speakers. This is the official report, which it is hoped to complete in the next supplement. There are two or three points about this form of publication of the discussions to which we wish to call attention. It will, in the first place, be noticed that the folios run on from p. 112 of the Special "Carbonization Conference"

Number of the "Journal" issued on Feb. 14. The object of this is so that anyone wishing to add the Discussion Supplements at the end of the Special Number can do so; and this also applies to the binding of the quarterly volume of the "Journal." An index to the papers and discussions will be given with the last Supplement; and in the Quarterly Index to the "Journal" under "Coal," the papers and discussions will be indexed with "Sp. No., Feb. 14" attached, and the appropriate folios. Several readers, however, are taking advantage of our offer to purchase the Feb. 14 Carbonization Number, with the Discussions stitched at the back, at 5s. per copy, in the same paper cover.

Eaton's Appeal Refused.

Edmund Octavius Eaton made application to the Court of Criminal Appeal last Monday for leave to appeal against his sentence of four years' penal servitude, after conviction on charges of publishing fraudulent statements, and with obtaining money by false pretences. The Court was constituted of the Lord Chief Justice (Lord Hewart), Mr. Justice Avory, and Mr. Justice Roche. Their Lordships considered the sentence was justified; and the application was dismissed.

Coal-Selling Schemes.

Coalowners of Lancashire and Cheshire representing over 90 p.ct. of the output have agreed to co-operate with Yorkshire, Nottinghamshire, and Derbyshire in the coal-selling scheme. The Lancashire and Cheshire District Collieries Commercial Association has been formed, with Mr. H. Speakman as President and Major A. Ratcliffe-Ellis as Secretary. The scheme, however, was not launched on March 1 as was hoped by the promoters, because there are a number of coalowners who have not agreed to the project. An effort is to be made to draw in "the stragglers," and to get the scheme under way by April 1. It is now supported by West Yorkshire, South Yorkshire, Nottinghamshire, Derbyshire, Lancashire, Cheshire, Warwickshire, Leicestershire, Cannock Chase, and one Association in Staffordshire. Another Staffordshire Association and Shropshire have repudiated the scheme. North Wales has not been asked to join.

Birmingham Section of the "B.I.F."

According to Mr. H. H. Berry, Chairman of the Electrical Section of the British Industries Fair, Birmingham, a big success has been achieved. He is reported to have said that, by the end of last week, actual orders, largely of a preliminary character, will have been placed to the amount of £5,250,000. But it is not the actual orders received during the course of the Fair that matters; it is the effect that the Fair has upon orders subsequently. It is not always that an advertisement, whatever its nature, fructifies immediately it is published; it may be productive some time afterwards. This is recognized by Mr. Berry, who says that numbers of orders for costly engineering plant are not definitely placed until after the Fair. The seed is sown at the Fair, and discussions start there. When effect is given to these, "it is reliably estimated that the total business resulting from the Birmingham Section of the Fair will, within the next ten months, exceed £25,000,000." The number of visitors to the Birmingham Fair, it is reported, exceeded 110,000.

Intelligent Decisions.

Symptomatic of changed view is a statement by Sir Frederick Mills, Chairman of the Ebbw Vale Iron and Coal Company. During the past few weeks, he has met certain sections of the workpeople and asked them to agree to "an enlargement of their working week;" and he is delighted to say that the men have been patriotic enough to their fellow-workmen to agree to this. He has not asked for a general reduction of wages or a general extension of hours. According to a report before us, the Company's Siemens' furnaces have been idle for years; but the men have unanimously agreed to accept the conditions offered them, and have intimated that they are prepared to start at once. One point in the terms is to be referred to an arbitrator; and the men have asked Sir Frederick to act in that capacity. Another good sign is that, on the recommendation of the Board, the shareholders of the Bolsover Colliery Company have agreed to issue 50,000 £1 shares to their workmen at par, and by easy payments. The maximum number to be issued to any workman is 200, and the minimum 25. A number of applications from the miners for the shares has already been received. Workmen's Committees have been appointed at each of the pits to confer with the management as and when required.

Non-Political Miners' Unions.

A tussle is proceeding between the remnant of the old Notts Miners' Association and the Miners' Industrial (or Non-political) Union, which Mr. George Spencer, M.P., formed in the Nottinghamshire coal-field in 1926, when there was resentment by the more intelligent men there regarding the insane policy of the Miners' Federation. Mr. Spencer's Union is to-day top dog; and it is the one recognized by the coalowners. At the pits owned by the New Hucknall Colliery Company, it has become a condition of employment that the men must belong to one Union, and that the new one. Hundreds of the men have booked-on under this condition; many who are standing out are wavering. The fear of some of the miners is that the same policy will extend to other collieries, and that the security of the Miners' Federation will be imperilled. The Secretary of this discredited organization—Mr. A. J. Cook—and a couple of like spirits spent last week-end in the neighbourhood of the secessionists to try to get them to see the error of their wisdom, and to endeavour to put heart into the remnant of the old Union. The Miners' Federation have got from somewhere £1000 to form the nucleus of a "fighting fund," but this will not go far among so many. They know this, and have sought the aid of the General Council of the T.U.C. The General Council could not endorse the policy of the Miners' Federation in 1926; but this is the case of a breaking away from the old trade union movement. It is not likely that the Council are in a position to finance even a local struggle; too much money was frittered away by the Unions in 1926. The intervention of the Council, it is believed, will take the form of trying to bring about a reconciliation. If it means the sacrifice of the principles on which the Miners' Industrial Union is founded, Mr. Spencer will not be a party to that movement. Thus no good can come from any such effort. What he knows is that he has the sympathy of all right-minded people throughout the country. In other words, public opinion is on his side, and is not prepared to support the machinations of those who would cripple industry and destroy employment.

MANCHESTER REGIONAL GAS INDUSTRIAL COUNCIL.

Ninth Annual Meeting.

The Ninth Annual Meeting of the Manchester Regional Joint Industrial Council for the Gas Industry was held on Tuesday, Feb. 28; and, at the invitation of the Chairman (Alderman Pollard) and members of the Oldham Gas Committee, it was preceded by a tour of inspection of the Hollinwood Gas-Works of the Corporation. Luncheon was provided by the Oldham Gas Committee.

Chairman.—Alderman F. S. Phillips, J.P.
Vice-Chairman.—Mr. C. E. Ross.
Hon. Auditors.—Messrs. J. H. Clegg and J. Blades.
Joint Secretaries.—Mr. J. H. Sillitoe and Councillor J. Williams, J.P.
Hon. Treasurer.—Alderman Sir William Kay, J.P.

In addition to various subjects affecting the industry, the Council have during the past twelve months adjudicated in numerous individual cases; and they report with satisfaction that in every instance their recommendations have been honourably followed. The relations between the two sides of the Council have been of the most amicable nature; and the smooth working of the labour side of the industry in the area continues.

PERSONAL.

The University of Manchester have approved the conferment of the honorary degree of LL.D. on Sir ALFRED MOND for public services, and in particular his services to industry.

Mr. G. V. HEELEY has been appointed successor to Mr. H. M. Tysoe as Engineer and Manager of the Milton Regis Urban District Council Gas Department. Mr. Tysoe left recently for Johannesburg to take up the position of Engineer and Manager of the Municipal gas undertaking there.

Mr. MATT. DUNN, M.I.Mech.E., late Engineer and Manager of the Stockton-on-Tees Gas-Works, has been appointed representative of the Whessoe Foundry & Engineering Company, Ltd., of Darlington, for the Midlands and North of England for the sale of their specialities in gas plant manufacture.

On his retirement after fifty years' service with the Bishop Auckland and District Gas Company, Mr. JOHN BURKE has been presented with a wallet of Treasury notes and a pipe, subscribed by the Directors and his fellow workmen. Mr. W. E. Walton, Secretary of the Company, made the presentation. Mr. Burke commenced work in the pioneer days of the Company, and recently retired as Yard Manager.

Mr. THOMAS HAWORTH, Assistant Gas Engineer and Manager at Oswaldtwistle, selected out of 93 candidates as Gas Engineer and Manager at Ripon, will take up his new duties towards the end of March. Trained at Blackburn Technical College as an ex-Service student, Mr. Haworth served at Oswaldtwistle for six years. He is a Fellow of the Chemical Society and an Associate Member of the Institution of Chemical Engineers.

OBITUARY.

The death is announced of Sir ALBERT GRAY, K.C.B., K.C., who came into close contact with the gas industry during the long period of twenty-six years for which he was Counsel to the Chairman of Committees of the House of Lords. Previous to being called to the Bar at the Inner Temple in 1879, he spent four years in the Ceylon Civil Service. He obtained his House of Lords appointment in 1896.

The death of Mr. ROBERT GAMBLE MARKS, of Southport, took place on Sunday, Feb. 26, under rather sudden circumstances. Deceased, who was 74 years of age, had been to a local football match on the Saturday, and returned apparently in good health. Later in the evening, however, he complained of not feeling well. He died evidently from a heart attack. Mr. Marks was formerly a lecturer on the management of gas stoves, in which capacity he had become well known throughout the country.

ELECTRICITY SUPPLY MEMORANDA.

THE opinion in the electricity industry is that the Electrical Section of the British Industries Fair at Castle Bromwich was well up to the standard set last year; but we have an idea from various remarks that have been made that our electrical friends who did us the honour of walking through the Gas Section, or took a surreptitious view of it, left it with an idea that the gas industry is neither dead nor sleeping. There was even an amount of private admiration, and certainly an enhancement of respect, with a silent resolve not to be misled by anything that any luminous body of the electrical journalistic world chooses to shed deceptively abroad. One electrical chief has told some of the members of the electricity industry that the Gas Section was a magnificent one; and that the electricity industry must energize itself if it wishes to make an equally good impression. We are not prepared to let the electricity industry beat us in demonstration or propaganda method. We have intrinsic merits of which it cannot boast—heat value for money, efficient and sightly appliances, and reliability both of supply and structurally through the organic simplicity of appliances to which gas lends itself. The standards of design, structure, and finish as seen at the Fair have been at once a revelation to, and humiliation for, those electrical people who have hitherto failed to make themselves acquainted with the advances of the gas industry. Its stick-in-the-mud position they find has been a myth—purely something concocted by certain imaginative writers who have attached themselves to electricity. Those who got to Castle Bromwich have received enlightenment.

Enlightenment in the Gas Section.

If we refer to the "Electrical Times" to see what their specialist has to say regarding the Electrical Section at the Fair, he does not seem over-elated, although he writes boldly. The electricity industry has one advantage in its shows. It is that there are so many small appliances and gadgets which appeal to the public eye, including wireless, of which every other person one meets nowadays knows something, and of which he or she professes to be an expert. However, if the gas area is confined to service and utility, there is such a mass of it that we are content without the embroidery of wireless and such-like. The electrical incompetents who try to rival us in the area of service and utility had their representatives at the Fair. The "Electrical Times" alludes to the many new developments and improvements in electric cookers that were on view; but those "developments and improvements" were not distinguished by any great novelty. In the forefront it is mentioned that the latest electric-cooker models indicate the prevalence of vitreous enamel finishes. This "new" fashion in the electricity industry has been a growing vogue in the gas industry for some time past: and imitation is, in these as in the old days, "the sincerest form of flattery." Any electrical man who visited the Gas Section must have been struck by the "prevalence" of the finish there, and in several appropriate hues, or combinations of them. Then as to electric hotplates it is mentioned that fully enclosed types are almost universal. The overseas markets—our Dominions are especially the subject of attention—are being catered for by electric cookers which only show divergence from those for home use by being of somewhat more robust constitution. Electricity suppliers find that the conditions of domestic service in the Colonies are such that a margin of safety has to be provided for somewhat rougher handling, which does not mean an improvement in efficiency. Of domestic electric fires there is nothing much to say. The variations in them in these days appear to be more in casing design than in any improvement in the vital parts. Our electrical competitors are still struggling with the problems of water heating by electricity; but specially mentioned are new rivals in thermostatically controlled water-storage tanks of a capacity of 1¾ gallons upwards. Electric wash-boilers are now presented with enamelled exteriors—the idea probably being that external attractiveness will do something to compensate for internal deficiencies and uneconomy. When we looked on the Electrical Section and then on the Gas Section, our satisfaction was great.

No Outstanding Developments.

Mention has previously been made of the fact that, in the week by week references to the progress of domestic electrification in the "Electrical Times," the cost per therm ratio (gas/electricity) is given in most cases. A correspondent of our contemporary in the North finds this objectionable, because, so he says, it is wholly misleading, as it takes no account of the efficiency of utilization. Those who are wise in the electricity industry are not now tempted to talk so much of the efficiency of utilization as they were wont to do, because they have found that, like many other things of which there has been boast in the electrical world, the superior efficiency in utilization dwells largely in imagination and not in fact, and that where there is a slight superiority (which is not in many places in electrical equipment) it is utterly swamped by the difference in therm cost and in the disreputable lag there is in electrical performance, to say nothing of the degradation that electricity brings upon service in the household by its unreliability. The person in charge of "Progress in Domestic Electrification" passes lightly over what he knows perfectly well are the defects of electrical operation, which supplement the objectionable information as to the cost per therm ratio; and he takes refuge in reference to one of the greatest examples of electric cooker installation in the country, and that is Manchester. It is estimated that in the city electricity area there will be 4600 electric cookers in use by March next—the number fixed on March 31, 1927, being 3029. It may interest our friend—and probably he will quote the fact next time he makes allusion to Manchester—that the increase in the number of gas cookers fixed in the last financial year alone was 6460, or for the one year nearly 29 p.ct. in excess of the total number of electric cookers expected to be connected up, and not necessarily in service, at the end of March next. At March 31 last there were 141,972 gas cookers in use and 19,248 grillers. We should like to ask the writer of "Progress in Domestic Electrification" something more about Manchester. How many of the total number of electric cookers have been fixed on the Corporation housing estates? How many are used by Corporation officers and employees, including those in the Electricity Department? Commenting on his own figures, and not on ours, the same wise writer says: "The true deduction from these facts and figures is obviously that the inefficiency of gas cookers and their disadvantages in use are such as to more than outweigh a difference of three-and-a-half times in the cost of the gross heat value of electricity compared with gas." We

Cost of Therm Ratio.

suggest to him that he should broaden his basis of consideration before asserting that the deduction he has already made is a "true" one. And as to the "inefficiency" of gas cookers, perhaps he would allow us to select one that was on view at the Gas Section of the "B.I.F." at Birmingham, and he one from the Electricity Section, and put them to comparative test, to settle whether or not his dogmatic assertion is justified. In the event, probably he would have to resign his position as a manufacturer and purveyor of electrical postulation.

Liberty to Purchase.

We congratulate some of the members of the Stoke-on-Trent City Council. They are not as some other councillors who try to rob of their freedom the tenants of houses on Corporation estates. The Electricity Committee proposed to make it a condition of giving a supply of electricity to houses on the Basford Hall Estate that no gas should be laid on for any domestic purpose. At the Council meeting where this benevolent intention was considered, a remark was made by Mr. J. M. Travers that he thought it very wrong for one Committee of the Corporation to seek to cut-out another Committee. What we think is a greater wrong is for a municipal body to attempt (although without authority to do so) to use their strength to compel the poor tenants of houses of which the ratepayers generally are the real landlords to use the most expensive form of heating known, with results such as have been seen at Woolwich, Liverpool, Newport, Cardiff, and elsewhere. A curious thing was pointed out by Alderman G. Hassall. It is that the houses in question are within the Wolstanton Council's area of gas supply. Now what would be the pretty legal tangle in which Stoke might involve itself, if the Stoke Council tried to prevent the Wolstanton Council exercising their statutory gas powers in any part of their own district? They could not prevent them having gas-distributing mains there; and if a householder, within the conditions laid down by the General Gas Acts, asked the Wolstanton Council to provide a gas supply, what would be their legal position if they refused? It is well to look at these matters from all aspects. Alderman Sampson Walker very properly moved the deletion of the condition proposed by the Electricity Committee. He did this on the ground of fair play. "It was neither honourable nor sensible to try to prevent Wolstanton residents from buying gas from their own gas-works." Others concurred, and the condition was deleted. Thus common sense overruled the suggested despotic plan for the making and execution of which the City Council have no authority. If they had, it would be something abnormal, and entirely opposed to the British principle of individual liberty so long as there is no offence against the law.

Electrical Ladies and Housing Schemes.

The members of the Electrical Association for Women are ambitious; and they must take heed lest they fall. If they allow their ambition to run too far, they may be regarded as a nuisance. They propose now to teach housing authorities their duty—to women. Plans have been made to organize what is to be known as an "Electrical Outlet Campaign." A preliminary survey is to be made on national lines; and then the Association are going to emphasize the woman's point of view to the responsible authorities. Coming from a body having the word "electrical" in its title, some of the housing authorities may look upon the representatives as being somewhat biased. Perhaps the Association had better exercise discretion as to which housing authorities they approach. Some of the latter have had a much troubled experience of electricity on housing estates. The Woolwich, Liverpool, and Cardiff Corporations, for example, know more from their direct experience of what the tenants on housing estates think of electrical operation than the members of the Electrical Association for Women can tell them. These "experts" in women's electrical requirements say that new houses must be wired not only for heat and light, but there must be in each room—especially in the woman's "workshop," which is the kitchen—an adequate number of wall plugs conveniently placed so that any desirable electrical apparatus may be used. The *modus operandi* is that the branches of the Association are to make suggestions as to the number of points required in each room of a typical house (of which a plan is to be made) such as is now being erected. Their headquarters will draft a "national specification." Members will proceed to visit housing estates to obtain information on the lines of a proposed questionnaire. The main Council, having considered the gleaned information, will make suggestions; and then deputations will be sent to the housing authorities to point out the discrepancies between provision (or non-provision) and the women's specification. When all the evidence—we suppose as to indifference—has been collected, an interview will be sought with the Ministry of Health. This is getting humorous. The Central Electricity Board are to be interrogated by the fair ones as to what steps they can take to help to forward the idea; and the Institution of Electrical Engineers, the British Engineering Standards Association, and the Electrical Contractors' Association are to be asked to see what they can do to promote the use of standardized plugs and sockets for domestic purposes. The ladies may be told that the electricity industry and municipal housing authorities are quite capable (or think they are) of managing their own affairs without outside interference. Perhaps the ladies will reply: "The industry and the housing authorities will not be so rude."

Mishaps.

During a confirmation service last Sunday week, at the Parish Church at East Barnet, the electric light failed. The service was being conducted by the Bishop of St. Albans (Dr. Furse). He had just commenced his address when the collapse occurred; and the only lights in the building were the candles on the altar. The congregation became very restive. The Bishop appealed to the members to keep their seats and remain calm. But the people did not like the position; and several were leaving the church when the illumination was restored. A North-East Coast news correspondent reports that there has been a failure of the electric light in the main shopping thoroughfare of Middlesbrough; and the collapse lasted nearly three hours, and at the busiest time of the week—about 8 o'clock on a Saturday night. Candles once more demonstrated their great utility on such occasions. Fortunately public lighting is by gas; but most public buildings in the district were thrown into darkness—for example, the General Post Office, Telephone Exchange, Grand Opera House, and the Theatre Royal. At both theatres, the performances were interrupted, while upwards of 200 candles were brought into use. Certain shopkeepers report that there were cases of pilfering when the light failed.

Overhead Wire Dangers.

Another instance of the danger of overhead wires reaches us from the mining village of Dreghorn, Ayrshire. The accident occurred last Wednesday. Through a steel wireless pole which was being erected coming into contact with a live overhead electric wire, one man was killed, and three men and a woman were seriously injured. The pole was being installed at the back of the cottage of James Nairn, head salesman in the grocery department of the Co-operative Society. Nairn was electrocuted. The other men were thrown to the ground—one of them having both hands almost completely burned off. The woman who saw the accident attempted to pull one of the men clear, and received a severe shock. All four were taken to hospital in a serious condition. But for the intervention of another man, who removed the aerial from the live wire with a long pole, the consequence might have been even more serious. Nairn leaves a widow and two children.

DURABILITY OF STEEL MAINS.

A notable example of the comparative durability of steel mains is afforded by a sample of steel main in the possession of the Bromford Tube Company, Ltd., of Birmingham. The accompanying photograph, which has not been retouched in any way, represents a section of steel main which was under-

ground for twenty years, and which showed no signs of corrosion when dug up. The Bromford Tube Company make the following claims in favour of the steel main:

Lighter, more economical, and ensures better service than cast iron.

Fewer joints, owing to the greater lengths provided.

Less risk of fracture. Consequently the all-steel main can be laid nearer the surface.

Easy bending on site, avoiding the ordering of "specials."

A big saving in leakages, owing to the facts that there are fewer joints and that steel is practically unbreakable, and therefore leakproof.

IDEAL HOME EXHIBITION AT OLYMPIA.

THE GAS INDUSTRY'S GOOD DISPLAY.

FEB. 28 to MARCH 24.

There is little doubt that the twelfth "Daily Mail" Ideal Home Exhibition, which was opened at Olympia by the Lord Mayor on Tuesday of last week, will be generally regarded as the most elaborate display of its kind which has ever been staged there. New features have been introduced in a new setting of striking beauty and attraction.

"SUNBEAM TOWN."

"Sunbeam Town," in the New Hall Extension, presents eight houses built, furnished, and equipped as though for permanent occupation; and it may be assumed that its name has been bestowed upon it because of the fact that practical domestic application is made here of scientific discoveries in relation to the effect of sunlight on health. Visitors will not, of course, fail to visit the "House of the Future," which is claimed to be the most daring display of the Exhibition's long history. This is the materialization of an architect's dream of the mass-produced home of many years hence.

THE "SUN-TRAP" HOUSE.

There is also in this section another house to which we would wish to draw special attention. That is the "A.M.A." Potters Bar "Sun-Trap House," which has been designed by Mr. W. J. King to catch every gleam of sunshine throughout the day in the principal rooms, and is glazed with "Vitaglass," which does not restrict the ultra-violet rays.

This house is fitted with the complete "Metro" gas and coke home service of the South Metropolitan Gas Company; and it is clearly demonstrated that gas and the use of coke absolutely fills the needs of such a house. In the sitting room (where a fire is needed for, say, 12 to 16 hours a day) a "Metro" No. 214 coke grate is installed; it being felt that where a long and steady heating load has to be provided, coke meets the case for middle-class residences, in which cost of running has to be taken into consideration. Here coke need not be regarded as a competitor with the gas fire, which is, of course, ideal for intermittent heating. The sitting room is beautifully illuminated by "Metro" shell brackets. In fact, the casual observer learns a lesson in every room as to how best to apply gas to his needs for lighting purposes, according to his varying requirements. With the exception of the coke fire already referred to, heating is provided by "Metro" gas fires; and the small "Metro-Log" fire is again proving very popular. An interested crowd can invariably be seen round this fire in the dining room. The kitchen is complete with coke boiler for hot water supply, gas iron, "Metro Clapham" cooker, and gas copper; while last, but not least, there is a gas-operated refrigerator. An alternative system of hot water supply for the summer months, when it would be inconvenient to use the coke boiler, is provided by a Ewart geyser.

Everything in this house, with the exception of the coke-burning apparatus, is shown under actual working conditions.

EMPIRE MARKETING BOARD.

Elsewhere an imposing display of the resources of the British Empire is provided by the exhibit of the Empire Marketing Board; and here, once again, the cookery demonstrations are carried out by means of gas. The British Commercial Gas Association and the Gas Light and Coke Company have co-operated in the design and equipment of the two kitchens. These two kitchens are fitted with Radiation eye-level cookers. Parkinson geysers supply the necessary hot water.

The Amalgamated Press, Ltd. ("Woman's Journal"), have a model kitchen fitted with Radiation eye-level cooker, Potterton boiler, and Davis "Burn-All" incinerator.

The Labour-Saving Section, too, is once more prominent with its multitude of exhibits showing how the more irksome domestic duties may be transformed.

GAS APPLIANCES IN MANY PARTS OF THE EXHIBITION.

The visitor who does the exhibition thoroughly will, indeed, come across many gas-consuming appliances in the course of his tour—some of them in the equipped houses in "Sunbeam Town," and others on the various stands. It is unnecessary to particularize; but as a guide to those desirous of inspecting such apparatus, it may be mentioned that devices for the purposes named are displayed by the following, among other, firms:

Gas cookers, fires, and grates: A. Bell & Co.; British Sa-Vall Company; Candy & Co. ("Devon" fires); Ernest A. Denyer (Flavel "Leamington" series); Economic Household Appliance Company, Ltd.; Falkirk Iron Company, Ltd. ("Smoothtop" gas ranges); J. Glover & Sons, Ltd.; Leeds Fireclay Company, Ltd. (Burmantofts' fireplaces); Manuel Lloyd & Co.; London Gas Exhibit; Radiation Limited; and Wood, Russell, & Co., Ltd. ("Sentry" boilers and gas fires).

Water heaters, geysers, gas coppers, &c.: Clarkhills, Ltd.; Express Boilers, Ltd.; Home Appliances, Ltd.; Lambert Heater and Engineering Company, Ltd.; London Gas Exhibit; New Geysers, Ltd.; Thomas Potterton (Heating Engineers), Ltd.; Radiation Limited; J. Rowell & Son; Ruud Manufacturing Company, Ltd.; James Stott & Co., Ltd.; and W. H. Sugden & Co., Ltd.

Miscellaneous: Electrolux, Ltd. (refrigerators and water softeners); Sturtevant Engineering Company, Ltd. (vacuum cleaning plant); United Water Softeners, Ltd. ("Permutit" system); and Duncan Watson & Co. (gas heated drying cabinet and ironing machine. A gas heated boiler fitted in greenhouse is shown by W. Duncan Tucker & Sons, Ltd.

THE "EVER HOT."

The models of the automatic gas water heater shown by Home Appliances, Ltd., of 42, Newgate Street, London, E.C. 1, are stated to be a new line in apparatus of this character, and are insulated like a thermos flask. This enables them to keep, on a small consumption, hot water ready for instant use, day and night. They are made in various sizes, and are guaranteed to utilize 85 p.ct. of the net heating value of gas burned; while the pilot light is guaranteed to maintain the temperature of the water in storage at 70° above room temperature on ¾ c.ft., 1¼ c.ft., and 1¾ c.ft. of gas per hour respectively for three specified sizes of heater. To certain models there is fitted a "leakage by-pass," which is designed to prevent waste of hot water through a dripping hot water tap anywhere in the house. Escape of hot water is absolutely prevented until the tap is turned on fully, or nearly so. The heater is, of course, fitted with a thermostat; and it is claimed to be useful for small central heating jobs, and to be particularly well adapted for heating a flat.

MAIN GAS EXHIBITS.

The main displays of gas apparatus in the exhibition are to be found on the stands of the London Gas Exhibit, Radiation Limited, and Thomas Potterton (Heating Engineers), Ltd., which are all close together in the Heating and Lighting Section, on the ground floor of the Main Hall; and these we will proceed to describe, in the order named. It may be added that the total number of exhibits using gas is 47; but many of these are only boiling rings, &c., for heating water for the preparation of samples, and for demonstrating various quick-frying devices, &c.

THE LONDON GAS EXHIBIT.

In this Exhibition, as heretofore, the manifold domestic uses of gas are excellently exemplified in the joint exhibit of the seven principal London and District Gas Companies—namely, the Gas Light and Coke Company, the South Metropolitan Gas Company, the Commercial Gas Company, the South Suburban Gas Company, the Tottenham District Light, Heat, and Power Company, the Wandsworth, Wimbledon, and Epsom District Gas Company, and the Croydon Gas Company—the arrangements for which were left in the hands of a Committee under the Chairmanship of Mr. F. W. Goodenough.

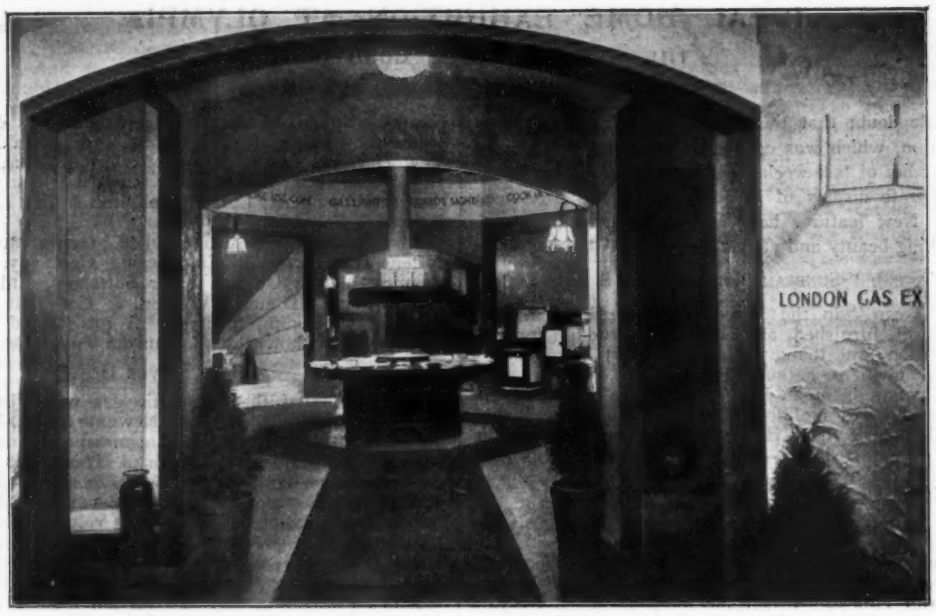
On the present occasion, the exhibit was designed, erected, and equipped by the South Metropolitan Gas Company. Externally it is in the form of an English castle. The interior supplies the reason underlying the external design—it is the Englishman's home. The position occupied by the exhibit is not the same as hitherto; it being now partly under the gallery. This change is, however, really not a disadvantage, as it affords an opportunity of showing coke-burning apparatus under actual working conditions—a thing which has not before been accomplished on a London Gas Exhibit stand.

The centre of the exhibit takes the form of an octagonal hall on original and very modern lines; the predominant colour being a beautiful orange, with graduated shading drawing the eye down to four of the very latest designs in gas fires and coke boilers, each of which stands alone. In the middle of the hall is an ebony table carrying a complete supply of literature, and surmounting this is a column holding what one might almost term a glass fountain of light. This has a remarkably striking appearance, and undoubtedly attracts the public on to the stand. The illuminated cascade effect is secured by incandescent burners arranged in steps under a wide band of glass above which is a narrower band.

Surrounding this centre hall are five rooms—sitting-room, dining-room, bathroom, bedroom, and combined kitchen and scullery—and all these rooms are fitted with leaded glass windows, which extend almost from floor to ceiling. In this way, not only is a very bright and inviting appearance imparted to the stand, but the more nervous members of the public are enabled to see the exhibit without being absolutely compelled to go on to the stand.

"METRO" COKE-BURNING GRATE.

A feature of the display is the "Metro" No. 113 coke grate, which is to be seen in operation in the sitting room. This is a



ENTRANCE TO THE OCTAGONAL HALL OF THE LONDON GAS EXHIBIT.

strongly made cast-iron grate. It can be easily and quickly assembled; and because of its artistic and finished effect, it adds to the selling value of the house in which it is installed. The grate is efficient and economical in use. The fire-bars are so constructed that ash filters through readily; and the ash tray is designed to remove ash without raising dust. The grate is fitted with a gas burner for igniting the coke, thus obviating the trouble, labour, and uncertainty of lighting a fire with paper and wood. In fact, by turning a tap placed at a convenient point at the side of the fireplace, and applying a match to the special burner inside the grate, the coke fire can be lighted-up as easily as a gas fire, and in about twenty minutes the gas burner can be turned-out. "Metro" coke grates are made in a variety of sizes and finishes to suit all requirements.

In the hall there is a "Kokette" coke boiler, also in operation, and supplying hot water to the bath and lavatory basin—thus affording an indisputable demonstration to the public of the efficiency of coke in maintaining a supply of hot water. There are, in addition to this coke system of water heating, gas circulating boilers, as well as five different-sized geysers.

"Metro-Log" Fire.

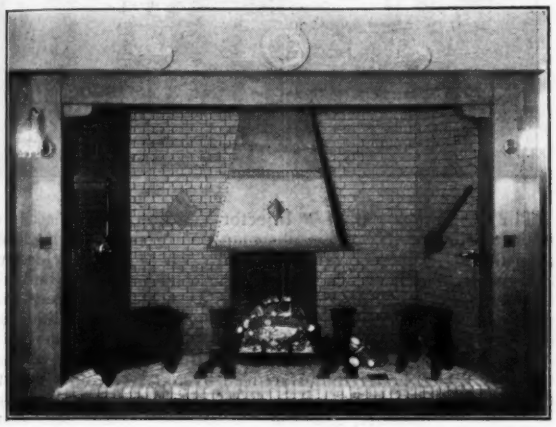
The decoration and furnishing of the dining room, which is panelled in oak, give it a delightful old-world appearance; and this effect is enhanced by a large, and extremely efficient, "Metro-Log" fire, with its charming ingle-nook setting, and its massive wrought-iron fittings. And so with the other rooms of the suite. Each is tastefully furnished, and equipped with the most modern and most appropriate appliances. One need really go no further to find the "ideal home." At all points the public are afforded convincing proof that gas lighting, properly planned, and well carried out, is as attractive and as artistic as any other system. Gas fittings of the greatest charm are to be found, if only one takes the trouble to look for them. Colour effects, by the use of glass and shades, are just

ARTISTIC LIGHTING FITTINGS, SWITCH CONTROLLED.

as easily obtained with gas as with any other illuminant. In the exhibit, all the lighting appliances are switch controlled. Fires and cookers to capture any fancy are on view—the latter demonstrating the striving of the gas industry to assist the housewife in the removal of unnecessary dirt. All the cookers shown are either wholly or partly enamelled. In the kitchen, too, there are three types of gas iron. Outside the home, the warming of greenhouse and garage is illustrated.

HEALTH VALUE OF FLAME.

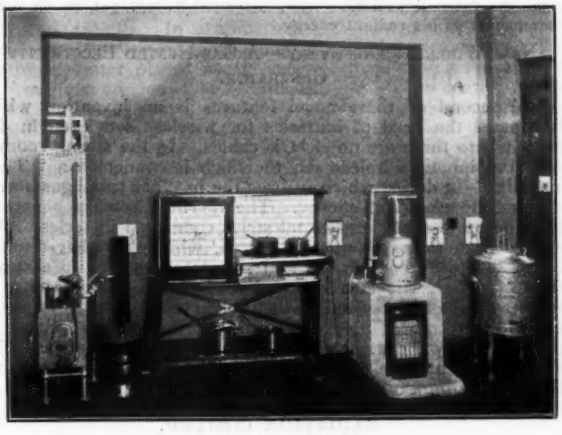
Before leaving this captivating display, mention must be made of two other special features. The first of these is a special lamp (shown in the bathroom) for providing stimulative heat rays derived from gas, burning on the surface of a metallic mantle. Many of our readers will already have seen the reference to this addition to the radio-therapeutic treatment of



The "Metro-Log" Gas Fire.

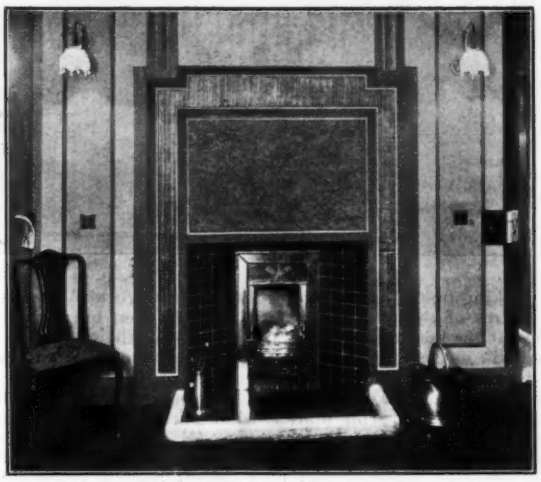
tuberculous patients which was made by Dr. Carpenter when addressing the proprietors at the recent annual meeting of the South Metropolitan Gas Company. This passage was in the following terms:

> You will be interested to hear of what promises to be an important investigation in which our officials, in conjunction with the Institution of Gas Engineers, have been taking part, in the determination of the penetration into the human skin of various forms of light and heat radiation—thereby enabling us to form some conception of what is meant by the term "comfortable heat." The work has been carried out under the direction of Sir Henry Gauvain, the Medical Superintendent of Treloar's Cripple Homes, at Alton, Hampshire. We have there erected an installation for producing this "comfortable heat," which is used as an integral part of the radio-therapeutic treatment of tuberculosis patients, and in which they are flooded, so to speak, with heat rays derived from gas, burning on the surfaces of radiating materials. We are but on the fringe of these



Kitchen Equipment.

interesting problems, and much remains to be done. There is still a great deal to be learned with regard to the properties of flames and the nature of the radiation they emit when burning in contact with various substances. We must wish this particular experiment all success; but, however it may turn out, there is no doubt that the last word has not yet been said of the health value of flame. It is, indeed, not unlikely that, in the case of the great luminary which heats and lights our earth, we probably depend at least as much



"Metro" Coke-Burning Grate.

FITTINGS FOR THE BATHROOM.

upon the thermal radiation from his incandescent gas as on other components of his radiant energy.

New Wireless Discovery.—A Gas-Heated Electricity Generator.

The second of these novel features is an invention which eliminates the need of batteries for wireless sets even in districts where there are no electric cables. In the sitting room is a Marconiphone wireless set, to which is connected a "Thermattaix"—a device which utilizes the heat of a small gas burner to generate electrical energy. The thermo-electrical generator is made up of compound metal strips connected in series. One end of each thermo-couple is heated, while the other remains cold. The difference in the two temperatures sets up a steady flow of an electric current; and as long as the difference of temperature exists, so long will the thermo-couples generate an electric current. The gas consumption of the appliance is approximately 8 c.ft. per hour; and the electricity generated is sufficient to operate any wireless set employing modern valves of low consumption.

RADIATION LIMITED.

On an island stand which has been so arranged that there is ample space for a full investigation of the representative appliances of the six constituent firms, Radiation Limited make an imposing display of modern gas-consuming apparatus, differing in exterior design, process of "finishing," &c., but all incorporating very advanced features of construction that have been developed or improved in the Radiation Research Laboratories.

Taking first the regulo-controlled "New World" gas cooker, features of this are that it has a single oven burner and the flue at the bottom of the oven, instead of at the top. The oven heat is automatically controlled by means of the "Regulo," which has a graduated dial at the side of the oven. This may be turned to give a number of cooking heats, and maintains them indefinitely, no matter what variations in pressure or quality of gas may be experienced. The hotplate boiling burners are of the "Rado" high-efficiency type, with flame openings so designed that they cannot become clogged when food boils-over. A cooking chart is provided; and a complete and carefully indexed cookery book is available, giving the necessary dial-setting for every dish.

Special attention may be drawn to the "Rado" mottled enamel in which the "New World" cookers are finished. This is the outcome of much careful experimenting. It is extremely hard, with a very high gloss that makes cleaning a matter of moments only. This enamel finish adds a great deal to the appearance of the "New World" cookers.

The Radiation patent "Injector-Ventilator" device is the main feature of the gas grates manufactured by all the Radiation firms. This consists essentially of a specially designed canopy, in which are two openings. The virtue of the design is that greatly increased ventilation is achieved, several complete changes of the air of the room occurring per hour, and entirely without the draughts associated with the coal fire.

The water heater display embraces three circulating boilers—the "B.T.U." boiler manufactured by Messrs. John Wright & Co., the "Hollar" boiler made by the Richmond Gas Stove and Meter Company, and the "Nautilus" coke boiler of the Davis Gas Stove Company. A white-tiled kitchen recess to take a gas cooker and circulator side by side is also shown. Examples of the geysers made by the Radiation firms are on the stand, as well as the "Novo" wash boiler. The six firms also show samples of their own patterns of gas iron.

Apart from these items, the following is a detailed account of the exhibits of each of the six constituent firms:

Arden Hill & Co., Acme Works, Aston, Birmingham.—"Acme New World" regulo-controlled gas cookers; the "Marchioness" gas grate in wrought iron, copper finish (which is shown alight); and a "King" gas grate in wrought metal, brass finish.

Davis Gas Stove Company, Ltd., Diamond Foundry, Luton.—"Alpine New World" regulo-controlled gas cookers; the "Antony" gas grate armoured in copper (which is shown alight); and a "Cleopatra" gas grate finished in armour bright.

Fletcher, Russell, & Co., Ltd., Palatine Works, Warrington.—"Kingsway New World" regulo-controlled gas cookers;

the " Desmond " gas grate in copper finish (which is shown alight); and a " Hamilton " gas grate in black finish.

Richmond Gas Stove and Meter Company, Ltd., Grappenhall Works, Warrington.—" Bungalow New World " regulo-controlled gas cookers; the " Bungalow New World " elevated range; the " Renaissance " gas grate in brown stippled lustre finish (which is shown alight); and a " Chippendale " gas grate in black and silver lustre finish.

Wilsons & Mathiesons, Ltd., Carlton Works, Armley, Leeds.—" Wilson New World " regulo-controlled gas cookers; the " Empire Sunbeam Interior " gas grate in oxidized copper finish (which is shown alight); and the " York " gas grate, with concealable boiling burner in canopy.

John Wright & Co., Essex Works, Aston, Birmingham.—" Eureka New World " regulo-controlled gas cookers; the " Eureka New World " gas range, in which the top of the oven forms a flat hob in the same plane as the hotplate; the " Inigo " gas grate in wrought metal, pewter finish (which is shown alight); and the " Vandyke " fire in wrought metal of copper finish.

THOMAS POTTERTON (HEATING ENGINEERS), LTD.,

Ravenswood Road, Balham, S.W.

This firm's exhibit consists of a full display of their specialities in gas boilers. There is a working model of a hot water supply installation automatically controlled for general household purposes, comprising a No. 921 " Victor " complete set, having in conjunction with it a towel-rail in circulation at the same floor level as the boiler plant. In this respect it is an excellent example of equipment for a single-storey building, either flat or bungalow, as it indicates the particular design that enables hot water radiators or towel-rails to work at the same floor level, in which case a low return is required, yet without affecting high-temperature delivery of water for washing and similar requirements.

On the active side, there is a No. 921 " Victor " set for intermittent action, demonstrating the quickness of production of hot water for occasional uses, such as sink and lavatory basins, or even baths, when the demand is not continuous. " Victor " boilers are particularly suitable in this way for general use, as it is not necessary to keep the plant running continuously during the afternoon or other times when hot water is not in demand. This plant shows, in from ten to fifteen minutes, while a visitor is on the stand, the rapidity of water heating by this means, whereby the maidless housewife can eliminate one of the most arduous items of household work—namely, that of firing the ordinary type of apparatus for the use of solid fuel.

PANEL HEATING ON THE CEILING.

Also on the working side of the exhibit, there is an installation of low-pressure hot water heating, with the standard form of radiators operated from a No. 19 " D " Series " Victor " boiler. This likewise demonstrates the warming of single-storey buildings. In conjunction with this installation there is an interesting example of panel heating by means of a circulating radiator placed on the ceiling, from which radiant heat of the most efficient type is afforded. With the central heating system there is shown the firm's successful arrangement of gas regulation by air-temperature control. Efficient thermostats, such as this type has proved itself, are, of course, of the utmost importance in connection with gas-consuming apparatus for the purpose named.

The non-operative side of the exhibit includes a full range of gas boiler units, with rectangular and circular storage. With the first-named type is a special form—No. 920—having modified storage provision, which has been specially designed for housing schemes. There is alternative apparatus for soft water districts. The " R " Series " Victor " boiler for central heating work is given special prominence on the stand; for although only introduced about twelve months ago, it has already more than justified its introduction. Excellent results with this boiler are being obtained in various parts of London and the Provinces.

THE CALORIFIER.

A further example of central heating is by means of a " Classic " boiler for low-pressure hot water heating, installed with a Potterton calorifier or " indirect " cylinder, to provide hot water for domestic supply during the winter months, and having as an alternative a " Victor " boiler for direct action to furnish hot water in the summer. This system has proved extremely useful, and is becoming very popular for villa residences. An alternative arrangement to this is to instal a No. 0 " Domestikatum " boiler having connections to the storage cylinder of a " Victor " complete apparatus which is worked direct. In connection with the consumption of coke, there are shown, in addition to the " Domestikatum " just mentioned, the " Britannia " and the " Goliath," each having its own particular uses. Lastly, there is a " Victor-Combination " boiler set, so designed as to fit into a small recess. For delivering water freed from lime and in a condition eminently suitable for all household purposes, there is shown here the " Kepho " water softener made by the Becco Engineering and Chemical Company, Ltd., of Fitzalan House, Arundel Street, Strand.

The illumination of the stand has again been undertaken by the South Metropolitan Gas Company, who have produced an excellent effect by the use of ventilating lamps.

It should be mentioned that Potterton " Victor " hot water apparatus has also been installed in the London Gas Exhibit and on the stand of the Staines Equipment Company; while in the " Sun-Trap House " is a No. 0 " Domestikatum " boiler, which forms part of the standard equipment. On the stand of the Amalgamated Press, Ltd., the " Woman's Journal " have a model kitchen fitted with a No. 921 complete apparatus.

FORTHCOMING ENGAGEMENTS.

March 10.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Meeting in the Royal Technical College, Glasgow. Paper by Mr. A. McDonald, of Motherwell, on " The Unification of Gas Undertakings."

March 10.—WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.—Visit to the Chain Works, Pontypridd. Paper by Mr. J. Hislop on " District Complaints."

March 13.—NATIONAL GAS COUNCIL.—Meeting of the Central Executive Committee.

March 13.—FEDERATION OF GAS EMPLOYERS.—Meeting of the Central Committee.

March 15.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting in Birmingham. Paper by Mr. S. J. D. Williams, of Stourbridge, on " Condensation."

March 17.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting in Leeds. Paper by Mr. J. W. Holroyd on " Mains and Services."

March 17.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Visit to the Cupar Gas-Works.

March 21.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1, 2.30.

March 21.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Visit to the Works of Messrs. W. C. Holmes & Co., Ltd., Huddersfield.

March 24.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to the Kilmarnock Gas-Works.

March 28.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Annual general meeting at the Hotel Cecil, Strand, W.C. 2, at 2.15.

March 29.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Annual meeting in Birmingham.

March 30.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting in the Westminster Technical Institute. Paper by Mr. F. C. Smith, of the Gas Light and Coke Company.

April 13.—BRITISH COMMERCIAL GAS ASSOCIATION.—Conference of the South Western District at Ilfracombe.

April 24.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Meeting at Tunbridge Wells.

May 3.—WALES AND MONMOUTHSHIRE DISTRICT INSTITUTION OF GAS ENGINEERS AND MANAGERS.—General meeting at Tredegar (Mon.).

May 9.—BRITISH COMMERCIAL GAS ASSOCIATION.—Conference of the Midlands District at Redditch.

May 17.—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual general meeting at the Hotel Cecil, W.C. 1, under the presidency of His Grace the Duke of Sutherland.

May 18.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Visit to the works of the Rochester, Chatham, and Gillingham Gas Company.

May 24.—BRITISH COMMERCIAL GAS ASSOCIATION.—Conference of the Cornish District at Truro.

INSTITUTION OF GAS ENGINEERS.

March 12.—Special Council Meeting for consideration of Royal Charter.

March 12.—Emergency Committee and Finance Committee.

March 12.—Effluents Research Chemists' latest report for presentation to Emergency Committee.

March 12.—Benevolent Fund Committee of Management.

March 13.—Executive Committee of Gas Education Committee.

March 13.—Wrought-Iron Tubing Research Committee.

April 2.—Special General Meeting of the Institution for submission of Terms of Royal Charter.

April 3.—Gas Education Committee.

May 1.—Refractory Materials Joint Committee.

May 8.—Executive Committee of Gas Education Committee.

June 12-15.—Annual General Meeting at Cardiff.

July 10.—Gas Education Committee.

Oct. 9.—Gas Education Committee.

Nov. 13.—Executive Committee of Gas Education Committee.

Dec. 11.—Executive Committee of Gas Education Committee.

COMPARATIVE WORKING RESULTS OF THE THREE METROPOLITAN AND FOUR OF THE SUBURBAN GAS COMPANIES.

STATEMENT SHOWING THE WORKING RESULTS AND THE REVENUE ACCOUNT COSTS PER THERM SOLD FOR THE YEAR 1927.

Compiled by Mr. F. J. BRADFIELD, the General Manager and Secretary of the Commercial Gas Company.

		Gas Light and Coke.	South Metropolitan.	Commercial.	Wandsworth.	South Suburban.	Tottenham.	Croydon.
Declared calorific value	B.Th.U.	500	560	475 & 500	470	500	500	500
Gas sold on declared calorific value	therms	231,715,250	89,927,520	19,832,765	16,782,732	18,365,407	15,918,995	13,300,002
Increase	per cent.	2 88	·60	·02	2·24	4·83	4·66	3 89
Gas made per ton coal on works tests	therms	71·76*b*	73·67	72·49	70·40	70·91	71·01	69·00
Gas unaccounted for	per cent.	4·39	1·94	6·15	7·26	7·48	6·22	4·69
Coke made for sale per ton of coal	cwt.	10·32	10·11	11·53	10·48	9·53	9·19	9·79
Tar made per ton of coal	gallons	10·23	·10·09	9 90	9·91	10·67	11·00	9 93
Liquor made per ton of coal	gallons, 8 oz.	35·33	41·47	37·27	38·20	37·50	31·69	38·71
Percentage of coke used as fuel		18·49	16·66	14·62	16·14	24·56	27·83	18·39
Capital expended per therm sold		s. d. 1 8·49	s. d. 1 4·67*e*	s. d. 1 7·18	s. d. 1 8·76	s. d. 1 11·94	s. d. 1 10·54	s. d. 2 1·43
Price of gas per therm	L'day, Mid.	d. d. 11⅜ 10½	d. d. 10 10	d. d. 10⅝ 10⅝	d. † d. 10 9⅝	d. * d. 11½ 11	d. d. 10 10	d. ‡ d. 12 11
	Mich's., Xmas.	9⅝ 9	9¼ 9¼	9½ 9½	8⅝ 8⅝	10 10	9⅜ 9⅜	10⅝ 9⅝
Costs per Therm Sold. REVENUE ACCOUNTS.		d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.		4·84	4·58	4·69	5·49	5·43	5·35	6·54
Less residuals—Coke and breeze		1·58	1·83	2·31	2·16	2·12	1·63	2·43
Tar		·66	·79	·73	·71	·76	·72	·59
Amm. liq. and sulph. amm.		·10	·17	·23	·08	·05	·12	·09
Total residuals		2·34	2·79	3·27	2·95	2·93	2·47	3·11
Net for coals, oil, &c.		2·50	1·79	1·42	2·54	2·50	2·88	3·43
MANUFACTURE—								
Salaries		·14	·22	·16	·23	·21	·16	·19
Wages—carbonizing		·44	·60	·53	·52	·61	·58	·58
Purification		·05	·14	·09	·12	·08	·12	·05
Repairs—plant		2·00	2·11	2·32	2·05	2·37	2·19	1·43
Net manufacture		5·13	4·86	4·52	5·46	5·77	5·93	5 68
DISTRIBUTION—								
Wages and salaries		·54	·30	·33	·44	·45	·28	·60
Repairs—Mains and services, &c.		·78	·66	·56	1·18	·86	1·76	·54
,, Meters and prep. meters and fittings		·06	·83	·72	·64	·92	·50	·34
,, Stoves—ordinary and prepayment		·71	·57	·74	·78	·58	·49	·41
Total net manufacture and distribution		7·82	7·22	6·87	8·50	8·56	8·96	7·57
Rents, rates, and taxes		·58	·36	·54	·26	·32	·50	·29
MANAGEMENT—								
Directors, Auditors, and salaries (Secretary, &c.)		·09	·10	·15	·12	·14	·15	·18
Collectors		·19	·20	·29	·22	·20	·20	·25
Stationery and general charges		·13	·21	·17	·20	·13	·14	·21
Co-partnership		·09	·22	·26	·28	·20	·14	·20
Bad debts		·01	·01	·01	·01	·01	·00	·00
Law and parliamentary charges		·00	·00	·02	·01	·02	·00	·01
Superannuations, Pension Funds, &c.		·17	·11	·23	·20	·28	·18	·29
National Insurance		·07	·23*f*	·06	·08	·06	·07	·04
Sundries		·00	·01	·01	·01	..	..	·00
Total expenditure (*less* residuals)		9·15*c*	8·67*g*	8·61	9·89*j*	9·92	10·34	9·04
Gas (*less* public lighting expenses)		9·72	9·09	9·24	9·75	10·68	9·42	10·75
Rentals—Meters and prep. meters and fittings		·82	·73	·78	1·12	·65	·43	·51
Stoves		·50	·40	·53	·95	·60	1·84	·51
Incand. mantle maintenance		..	..	02	·13	..	..	..
Miscellaneous		·03	·01	·01	·03	·01	·03	·03
Total—Gas, rentals, &c.		11·07	10·23	10·58	11·98	11·94	11·72	11·80
Balance, being profit		1 92	1·56	1·97	2·09	2·02	1·38	2·76
Dividend and interest		1·71	1·49	1·79	1·54	1·61	1·50	2·00
Surplus or Deficit		·21	·07	·18	·55	·41	*Def.* ·12	·76
Contributions to funds and sundry payments		·15*d*	·06*h*	..	·16*k*	·12*i*	..	·48*m*
SUNDRIES.		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton		30 11·86	27 1·55	26 6·98	29 6·04	30 7·00	31 5·20	40 5·50
Coke realized per ton of coal		10 10·62	10 9·86	13 6·04	11 4·77	13 1·66	10 1·02	14 9·36
Coke ,, ,, of coke		21 1·19	22 0·65	23 5·17	21 8·95	27 6·81	21 11·34	30 2·23
Breeze ,, per ton		7 9·14	0 2·80	4 5·26	7 6·37	8 7·32	8 1·58	14 5·77
Tar realized per gallon		0 5·67	0 5·59	0 5·18	0 4·75	0 5·56	0 4·87	0 4·50
Amm. liquor, &c., realized per butt, 8 oz.		2 2·82	2 7·23	4 0·39	1 4·22	11·97	2 11·52	1 10·45
Percentage of stoves at rental to consumers		95	114	101	93	116	87	100
Bad debts per cent. on total receipts		·09	·06	·05	·07	·06	·03	·07
Net profit per cent. on ordinary capital		6·13	6·63	6·70	9·81	8·99	7·02*l*	9·68
One fifth penny variation equals gross		£193,096	£93,675*a*	£20,659*a*	£13,986	£15,305	£13 266	£11,083
Water gas per cent. on total make of cubic feet		28·22	..	10·67	12·98	24·64	26·54	28·95

a—One farthing variation.
b—Before benzole extraction.
c—Exs. Brentford amalgamation eliminated.
d—Exs. Brentford amalgamation ·12d., redemption fund ·03d.
e—Ordinary stock of South Suburban eliminated.
f—Including co-partnership insurance fund.
g—Exs. South Suburban agreement eliminated.
h—Exs. South Suburban agreement.
i—Special purposes fund.
j—Excluding special purposes fund.
k—Special purposes fund.
l—Including electricity results.
m—Reserve fund ·12d., renewal fund ·18d., pension fund ·18d.

ADDITIONAL PRICES:
*—Outlying districts—Lady Day and Midsummer, 1d.; Michaelmas and Christmas, ·8d.
†—Wimbledon 1d. Epsom 2·2d.
‡—Caterham ·8d.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

ANNUAL MEETING.

The Fifty-Eighth Annual General Meeting of the Institution was held on Friday, March 2, at the Midland Hotel, Manchester.

It was preceded by a visit, in which 115 members took part, to the Victory Works of Messrs. Parkinson & Cowan (Gas Meters), Ltd., at Stretford, where they were cordially welcomed by the representatives of the firm, including Mr. Franklin Thorp (Director), Mr. Malcolm (Secretary), and Mr. A. Whatmore (Works Manager). In six parties they made a tour of the works, watched the various processes carried out, and showed particular interest in the station meters and the maximum demand indicator (Carr and Thorp patent). They saw in operation an enamelled "Suburbia" gas cooker, made by the Parkinson Stove Company (an associated firm), which had been brought back from the British Industries Fair, where it attracted the attention of the King and Queen. In contrast with the modernity of the works in construction and lay-out and in products, was a 20-light dry meter which was fixed in 1869 by the firm of W. & B. Cowan, and from that time was never opened until its removal in 1925, when it was tested and found to be correct.

An illustrated description of the works is appended to this report.

Luncheon.

After the inspection, the visitors proceeded to the Midland Hotel, where they were entertained at luncheon by the firm.

Mr. C. S. Shapley presided, and, in proposing a vote of thanks to the firm for their hospitality, said he was sure all who had gone through the Victory Works that morning must have learned something they did not know before. They had been given an insight into the internal economy of a gas meter which must have enlightened them. Especially those who had repair shops under their control, must have found the visit instructive. He had to do with a large repair shop, and could speak for himself in this matter. With the vote he coupled the name of Mr. Franklin Thorp, who was not a stranger to them. He had been the President of the Junior Gas Association, and had filled that post with credit to himself and with advantage to the members. With the vote should be coupled also the name of Mr. Malcolm, who had been very attentive to the members, and had made the arrangements.

Mr. R. H. Ginman seconded the vote, and mentioned that it had been his privilege to know Mr. Thorp for 26 years.

The vote was passed with acclamation.

Mr. Franklin Thorp said his Chairman, Sir Henry Cowan, was very sorry he could not be present to meet the members. With the other Directors, he appreciated as an honour their desire to go round the works and see what the firm were doing. It was many years since he was the President of the Junior Gas Association. He had always regarded it as a great honour. Mr. Ginman was his immediate predecessor; and he had in his possession a photograph of the Council of the Junior Association in which Mr. Ginman was the central figure. During the next twelve months Mr. Ginman was to be the central figure in the Institution. That he would have as happy a time as he had in the Junior Association in those bygone days was the sincere wish of his old friend Mr. Thorp. He hoped the members would come again to the works individually, and have a good look round. The firm tried to make a really good article; and in the course of the inspection he had pointed out the circumstances which were in their favour. They were practically the only firms who, in regard to metal work, made everything themselves, starting with the virgin metal. They did their own tinning, and all the rest of it. So they knew the material put into their meters was the best that could be obtained. They were proud of that, and they were also proud of the fact that the first gas meter ever produced was made in Parkinson's works in Cottage Lane, London, more than a hundred years ago. Both the firms who constituted the present Company were more than a hundred years old. Both had been as progressive as any other people in the gas industry; and he believed the members had seen sufficient that day to convince them that at the Victory Works they were making new things which would be of advantage to the gas industry. [Applause.]

BUSINESS PROCEEDINGS.

The business meeting was attended by about 140 members. Mr. C. S. Shapley presided. After the confirmation of the minutes of the last meeting, the next item on the agenda was the induction of two new members—Mr. Arthur F. Yates, Engineer and Manager, Gas-Works, Goole, and Mr. Edward Crowther, Deputy Gas Engineer, Bradford. To Mr. Yates, who was present, the Chairman addressed a few words of cordial welcome. He also referred to the fact that Mr. Charles Wood, who had filled the position of Chairman of the Yorkshire Commercial Section, had resigned owing to ill-health. It was agreed that the best wishes of the members for his restoration to health should be sent to Mr. Wood.

The annual report and statement of accounts were passed unanimously.

Commercial Sections.

Mr. S. Meunier (Stockport) moved the adoption of the report of the Lancashire Commercial Section, which he described as being rather "short and sweet." It did not cover quite as much ground as the work actually carried through had done. The question of incandescent gas mantles had been taken to the National Gas Council. What had been done there, he did not know; but he believed a meeting had not yet been summoned to deal with the matter. The question of a meter guarantee had also been taken to the National Gas Council. Ammoniacal

liquor was a very important matter in Lancashire; and it was to be hoped something would be done in regard to it. Consideration had been given to the methods of charging for gas—a question which had been before the Section and others on many previous occasions. They had been waiting for a report from the National Gas Council.

The report was unanimously adopted.

Mr. E. H. Hudson (Normanton) proposed the adoption of the report of the Yorkshire Commercial Section. He said he thought there was no phase of the commercial life of a gas undertaking which had not been dealt with in the course of the year; practically everything had come under consideration. It was to be hoped that something would come to relieve the situation as far as ammoniacal liquor was concerned. In Yorkshire they had gone a little farther than their Lancashire friends, and had put before the National Gas Council a proposal that some scheme be adopted to improve the position in respect of that product. They had gone so far as to suggest that a handsome sum of money be offered as a prize to anyone who would devise some means of utilizing ammoniacal liquor profitably in lieu of the present process of conversion into sulphate of ammonia, or a process which would eliminate a good deal of the cost which that conversion now involved. The proposal had been referred to a Special Committee of the National Gas Council to report upon. They awaited with some anxiety the report of that Committee, and entertained hopes that something would be done to put this matter on a satisfactory footing. The Commercial Sections were doing a great work; and he appealed to all the members to be loyal to the rules which governed the working of them. ["Hear, hear."] It would be to the good of all concerned.

The report was adopted unanimously.

Benevolent Fund of the Institution of Gas Engineers.

Mr. S. Tagg (Preston) moved that the usual sum of ten guineas be granted to the Benevolent Fund of the Institution of Gas Engineers; and it was agreed to.

Mr. G. S. Frith (Runcorn) moved the adoption of a recommendation of the Committee that, in addition to the above sum, a special donation of ten guineas be made this year. He said the Benevolent Fund was doing a very good work, and every penny subscribed would be well spent. This was agreed to.

Council Representatives.

Recommendations of the Committee were also passed unanimously that Mr. R. H. Ginman (Leek) be appointed the representative of the District Institution on the Council of the Institution of Gas Engineers; and that Messrs. W. Buckley (Manchester) and W. B. McLusky (Halifax) be appointed their representatives on the Councils of the Lancashire and Yorkshire Junior Gas Associations respectively.

The New President.

The Chairman said it was now his pleasing duty to hand-over the honour and duties of the office of President to his esteemed friend Mr. R. H. Ginman. The Lancashire members knew Mr. Ginman even better than he was known in Yorkshire. They all welcomed him to the office of President; which they were sure he would occupy as worthily as any of his predecessors. It was his (Mr. Shapley's) earnest wish that Mr. Ginman would have as happy a time in the chair as he himself had enjoyed. He took the opportunity to express his sincere appreciation of the way in which the Lancashire members had rallied round a Yorkshire man, and had attended meetings held outside the Lancashire area.

Mr. Ginman then took the chair, and offered Mr. Shapley their best thanks for the great services he had rendered to the Institution by his discharge of the Presidential duties during the last two years. He had very much pleasure in asking Mr. Shapley to accept the Past-President's badge, with an extra bar indicating that he had been President in a second year. The members joined in the hope that Mr. Shapley would be long spared to help them with his great knowledge and experience.

Mr. Shapley replied that he had appreciated the honour of being President of the Institution.

PRESIDENTIAL ADDRESS

of R. H. Ginman, of Leek.

Gentlemen,—In the first place permit me to thank you for the high honour you have conferred upon me by electing me your President, which office I accept with the approval of my Committee.

In selecting a topic for my official address to you, there seemed to be three courses open. I might attempt a general review of the present position in the gas industry; I might concentrate on one or two special phases of our work as engineers or managers; or I might confine myself to my own undertaking, and the work I have there done. My choice has fallen upon the topic of what it has been my lot to do in the extension and development of the undertaking of which I am at present in control.

The gas undertaking of the Leek Urban District Council, of which I have been in charge since the opening of 1914, has now an output of about 174 million c.ft. It is of a size of which there are very many examples in this country; and my experiences will, therefore, be of interest to more members than if it had been one of a larger size. This Institution visited the Leek Gas-Works in 1907, when their maximum day's output was 600,000 c.ft. made in inclined retorts. These have now been wholly replaced, and the works widely reconstructed; and my Committee hope you will visit them in the course of the next few months.

The District and Its Possibilities.

The area of the Leek Urban District is 1460 acres, and the population is now estimated to be 18,000. It is a singularly compact area; the town being all contained within a radius of 1500 yards, measured from the centre of the Leek market place.

The total number of dwelling houses in the district is 4366. There is little growth to be expected in this area. We already supply the village of Rudyard, situate 2¼ miles from our works. A 6-in. main supplies 81 consumers. Growth here, however, is very slow.

On the south and south-west of our area we have recently received encouraging inquiries for gas from the village of Leek Brook, where an industrial load can be obtained up to 10 millions per annum. The County Mental Hospital at Cheddleton requires upwards of 2 millions per annum. This would make it possible to link up the villages of Cheddleton, Wall Grange, and Longsdon.

There are two small works within seven miles from the villages named; the combined make being 36 millions per annum, selling gas at 6s. net per 1000 c.ft. Something might be said from a national standpoint for supplying these with gas in bulk from the same high-pressure steel main; but my Council have to approach the suggestion with great caution.

THE PRESIDENT,
R. H. Ginman, of Leek.

The Leek Works in 1914.

When I took up my duties at Leek in 1914 the make of gas was 116 million c.ft., and the carbonizing plant consisted of eight settings, each of eight inclined retorts; five settings having been erected in 1900 and three more in 1907. The general situation was that the carbonizing plant was approaching the limit of its useful life, and the effective gasholder capacity was only just sufficient in relation to the maximum day's output. The works, though splendidly situated as regards road and rail communications, had no ground space available for any considerable extensions. The purifiers and washers were ample and in good condition; but the boilers, condensers, and coke plant required to be extended or replaced, a further exhauster was necessary, and the valve house and connections had become inadequate for the demand, as to both volume and pressure.

It would be easy, but profitless, to calculate how much more cheaply the alterations and extensions carried out since the war ended could have been done under pre-war conditions. Had we been able to foresee the post-war conditions, doubtless all of us would have hastened to anticipate future developments. In Leek, though extensions and reconstruction were looming up in the future, no unnecessary delay had occurred. When these alterations were undertaken, at a time of high prices and dear money, the heavy wear and tear of the war years and their increased demand for gas had been added to the conditions existing when pre-war alterations were possible. This is placed on record in justice to the Leek authorities, and to the memory of my predecessor, the late Mr. S. Trow Smith, afterwards Gas Engineer at Malvern.

Three problems arose for solution:

(*a*) The development of local sales for coke.
(*b*) The improvement of gas service by the provision of more adequate holder storage, by an augmentation of the speed of the gas stream leaving the works, by uniform and adequate pressure of gas in the district.
(*c*) The reconstruction of the carbonizing plant and its accessories.

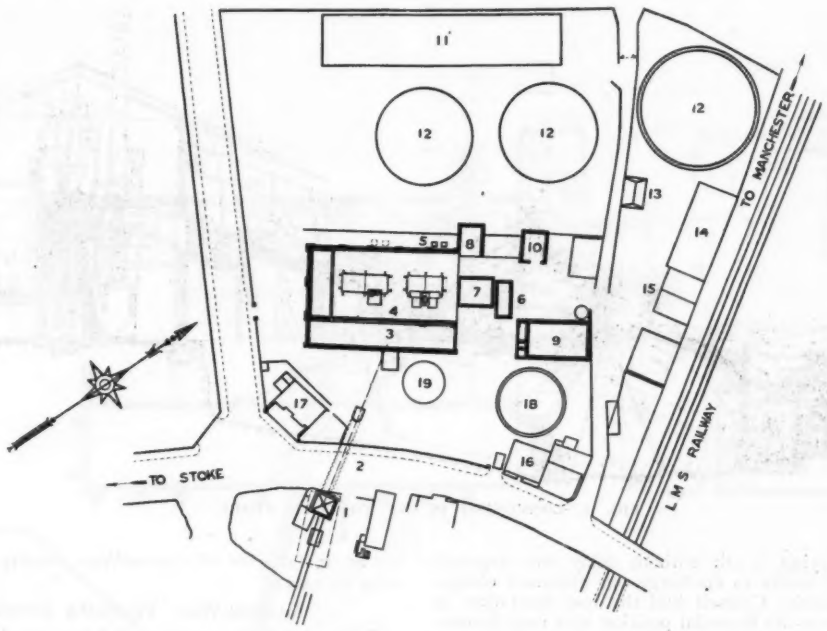


FIG. 1.—BLOCK PLAN OF LEEK URBAN DISTRICT COUNCIL GAS-WORKS.

1. Coal Receiving Hopper.
2. Band Conveyor.
3. Coal Store.
4. Retort House.
5. Condensers.
6. Coke Hopper.
7. Exhauster House.
8. Boiler House.
9. Meter House.
10. Washer House.
11. Purifiers.
12. Gasholders.
13. Valve House.
14. Covered Stores.
15. Baths and Blacksmiths' Shop.
16. Offices.
17. Manager's House.
18. Underground Water-Tank.
19. Tar and Liquor Well.

TACKLING THE COKE SITUATION.

Tackling the coke situation was possible even under the early war conditions. Accordingly, a coke breaker and screen were installed with three sizes of perforations, and a horizontal gas engine to drive the plant. These cost £130, and were paid for in two years out of revenue. At the same time, measures were taken to develop the local sales. The improvement hoped for was secured; and it is now possible to report month by month that on an average there is no more than 5 tons of coke in hand.

LAND FOR EXTENSIONS BOUGHT.

Any uncertainty as to the order in which these operations were to be undertaken was largely obviated by the outbreak of war and the conditions from 1914 to 1920, which are still fresh in all memories. Work had to be carried on at Leek, as elsewhere, with existing plant. One development, however, was possible; and it was promptly carried into effect. Immediately adjoining the works was a plot of ground 2761 sq. yards in extent, belonging to the Churnet Valley Engineering Company. Seeing that it was an ideal situation for the new holder and valve house which were considered advisable as soon as their erection was possible, the Gas Committee purchased it. Sanction was promptly given after a Ministry of Health Inquiry in November, 1914; £600 being allowed for the ground and £400 for the buildings on it. The money for the land was taken upon a 30 years' loan, and the £400 for the buildings was paid out of revenue.

NEW EXHAUSTER.

The only other piece of plant improvement we were able to do during the war years was the urgent one of replacing the old No. 1 exhauster of 15,000 c.ft. capacity, hampered with uneconomical driving and governing, by a 40,000 c.ft. rotary four-blade machine. No. 2 exhauster had been put down in 1900, and had a capacity of 40,000 c.ft. No. 1 was quite unable to deal with the output by itself; there was no stand-by plant; and if anything then had gone wrong with the larger one, we should have been in grave difficulty.

GAS SUPPLY—VOLUME AND PRESSURE.

Little more could be done during the war period than to consider future plans. In June, 1918, the Ministry of Reconstruction inquired what materials would be required for urgent work in the twelve months following the cessation of hostilities. The need of extending the existing gas storage and improving the delivery of gas to the town had manifested itself unmistakably at various times during 1914 to 1918, and the prior claim of this development was obvious. A proposal was, therefore, submitted to the Ministry for a new half-million c.ft. holder and a new gasholder valve house and connections; and a report was submitted to the Gas Committee in August, 1918, along with drawings and specifications of the proposed work.

NEW HOLDER AND TANK.

The suggestions made were:

(*a*) The erection of a 500,000 c.ft. spiral-guided holder of three lifts in a steel tank 102 ft. 1½ in. in diameter and 25 ft. 6 in. deep.

(*b*) A new valve house and new connections with seven 18-in. valves; suitable provision being made for future extensions.

As the tank balcony would come within 6 in. of the Railway Company's boundary, careful inquiry and calculation had shown that no other type of tank was possible without expensive retaining walls. Besides, the sandstone rock afforded an admirable foundation for a steel tank, and the gas undertaking had had costly experience with the brickwork tanks of the two existing holders.

The scheme and plans were accepted by the Council; a Ministry of Health Inquiry followed in February, 1919; approval by the Ministry was given in August, 1919; and tenders were invited in December, 1919. The contract for the holder, tank, valves, and connections was placed with Messrs. R. & J. Dempster, of Manchester.

The holder tank is entirely above ground, with sufficient space around to permit of its being painted to its full depth. It is fitted with a balcony 2 ft. wide which gives lateral stiffness to the tank curb and provides facilities for inspection and painting. The crown is trussed; and while the whole holder throws 11 in. pressure, the inner lift throws 6 in., so its full capacity is available for supply to the town. The tank carriages are of the "Bearscot" patent quadruple roller type, all steel, while the control carriages on the dips of the holder are of the "Bearscot" twin yoke type, adjustable from the outside and fitted for expansion and lubrication. Hand-railing is provided round each dip, in addition to the guard rail round the tank balcony and the crown to ensure the safety of the workmen.

NEW VALVE HOUSE AND CONNECTIONS.

The valve house is 22½ ft. by 15 ft., and the old inadequate connections are replaced by two receiving mains 24 in. in diameter, fitted with seven control valves 18 in. in diameter. Provision is made for future extensions. Any or all of the valves can be inspected easily and thoroughly; all the connections being above ground. The floor of the valve house over them is composed of a movable iron grating, which also admits of thorough ventilation. Considerable difficulties were encountered in coupling to the various holders and maintaining meantime the usual supply pressures; but the work was accomplished without causing any inconvenience to the consumers.

There are now three station governors; one on a 12-in. main supplying the low levels, one on an 18-in. main for the high levels, and one on a 6-in. main serving the extension to the village of Rudyard. The station meter is of 50,000 c.ft. per hour capacity.

Though the cost of all this work was about 2½ times the pre-

FIG. 2.—CONVEYING PLANT TO COAL STORE.

war figures, the carrying it out without delay was urgently needed to ensure our ability to discharge our statutory obligations. The Leek District Council had the less hesitation in ordering its execution as its financial position was very favourable. A final debt payment in October, 1922, left them with an annual interest and capital repayment (apart from any borrowings on this scheme) of only £565 a year, or 1d. per 1000 c.ft. of gas made. Including the borrowings for this scheme the outstanding debt at the next Government Inquiry, in 1923, was given as £48,480, or £370 per million c.ft.

When this holder was begun, we had the other two 250,000 c.ft. frame-guided holders in brick and masonry puddled tanks; No. 1 erected in 1879 when the output was 30 millions, and No. 2, enlarged to this size in 1900 when the make was 77 millions. When the third holder was completed, the annual make was 140 millions.

Entirely New Carbonizing Plant Needed.

Having now made sure of our ability to give a good service of gas under all conditions and at all times, the next point to engage attention was the reconstruction of the carbonizing plant.

In May, 1922, a report on the plant pointed out that No. 1 bench of retorts had been erected in 1900, that its cost would be wiped out before the end of the year, that it was in poor condition—the buckstays on the furnace side bulging quite 6 in.—and that to make the stage floor safe it needed to be supported by pillars from the cellar floor. The safe working limits would be reached in about two years, and it was necessary to consider the question of replacing these retorts with a more modern plant.

In May, 1923, this bench of retorts had passed the limits of its useful life, and needed extensive renewals and repairs. Moreover, these renewals and repairs for the four previous years had reached the high average of £1150 per year. It was evident that horizontal retorts with stoking machinery were not a suitable proposition for these works. Continuous vertical retorts were strongly recommended; and a scheme was prepared for an installation of Glover-West retorts to be put in hand early in 1924.

Glover-West Verticals Recommended.

Before deciding to recommend this installation of vertical retorts, I had given very careful consideration to the financial situation, in view of the inevitably high costs of any new scheme and the enhanced rate of interest that would have to be paid on the necessary loans. Fortunately the low amount of outstanding pre-war loans, the sound financial basis of the undertaking, and its increasing prosperity could be set off against the large outlay now pending. It was, of course, absolutely necessary so to plan the reconstructions as to secure such great economies in future working, especially in labour charges, as to counterbalance the enhanced cost of the new work, and thus avoid both high charges to the consumers and a hampering burden of debt to the Council. This was steadily kept in mind during the long planning of the new carbonizing arrangements. It is sound practice to plan in the engineering drawing office, and make drawing after drawing—scrapping, if needs be, plan after plan—in order to win through to the most economical and smooth-working design. So, too, it was deemed time and labour well spent systematically and repeatedly to explore the possibilities of so designing the construction, layout, and operation of the gas-making plant as to avoid unnecessary travel and handling of coke and coal, to simplify and co-ordinate the operations, and to enable works operations to be satisfactorily carried through with the minimum number of workmen.

A Ministry of Health Inquiry was held on Sept. 28, 1923, when a revised tender from West's Gas Improvement Company, Ltd., was submitted, providing, at a cost of £22,500, for:

(*a*) An installation of twelve Glover-West vertical retorts, with coal and coke handling plant, of a guaranteed output of 720,000 c.ft. per day, with waste-heat boiler.
(*b*) The demolition of the existing materials on the site to the extent necessary.

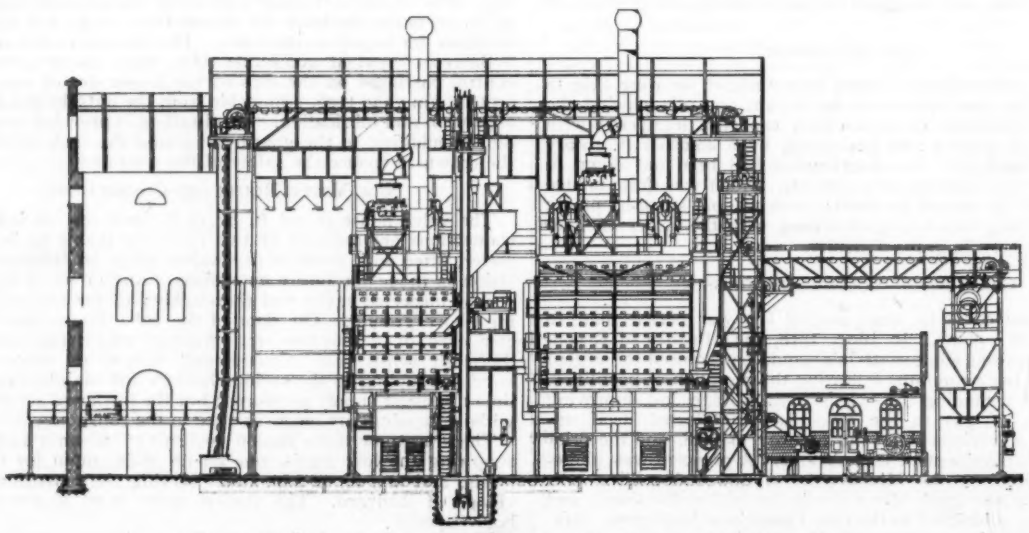


FIG. 3.—INSTALLATION OF VERTICAL RETORTS, GLOVER-WEST SYSTEM.

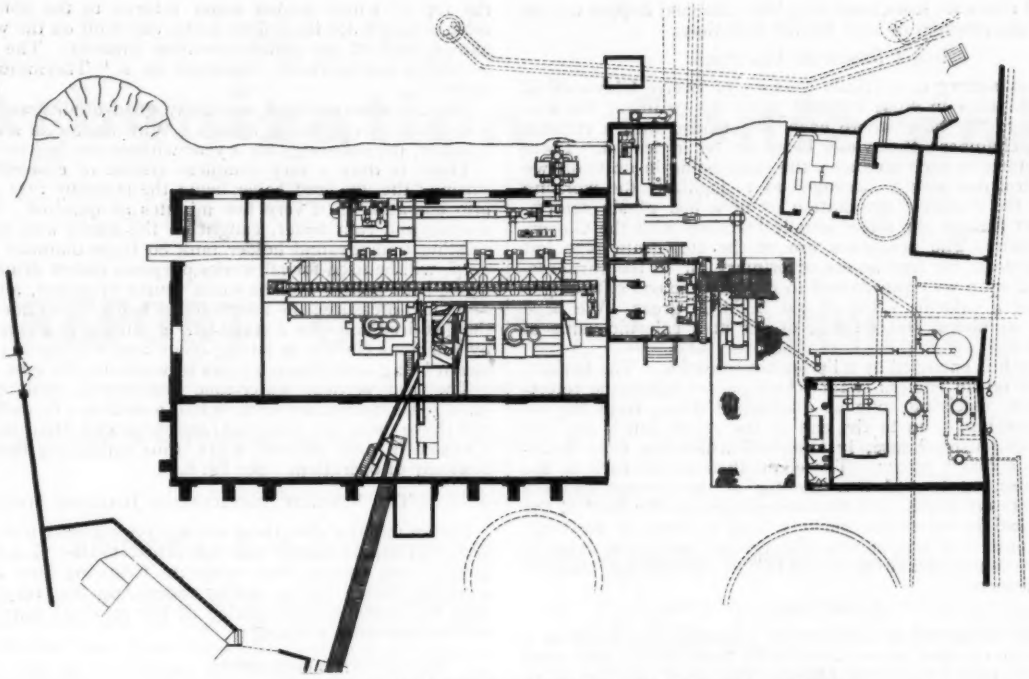


FIG. 4.—INSTALLATION OF VERTICAL RETORTS, GLOVER-WEST SYSTEM.

(*c*) New water-tube condensers.
(*d*) A new boiler house and boiler setting for the existing Cornish horizontal boiler, and a new gas-fired Spencer-Bonecourt auxiliary boiler.
(*e*) A new exhauster house.
(*f*) A new water-storage tank.
(*g*) Excavation and foundations.
(*h*) New foul mains and various other accessories.

It was pointed out at this inquiry that the cost of the original installation of inclined retorts in 1900 had been paid off, and that, in the case of the subsequent extension of the house and plant, only £956 of the £6600 spent was still unpaid, of which sum only £400 was on works now marked for demolition.

In October, 1923, Government sanction for the work and the loan was given. In the following month the contract for the major portion of the work was let, and in February, 1924, the demolition of three-eighths of the inclined retort plant was commenced.

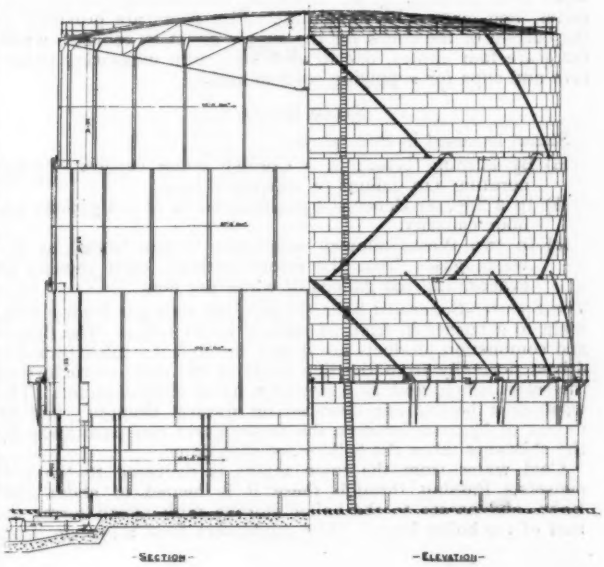
The rearrangement of the works mains consequent on the provision of new condensers and the removal of the exhausters to a new position involved a critical interval during which no gas could be made. For this the August holiday period was chosen. All new material was got ready and erected as far as possible, and at 6 a.m. on Aug. 5, 1924, gas-making in the inclined retorts was shut down. The carefully-laid plans were carried through without a hitch; and at 6.30 p.m. on Aug. 7, gas was turned into the new mains. Gas-making in the new vertical retorts was begun on Nov. 10; and on Nov. 14 the inclined retorts were shut down and never again used.

RETORT HOUSE ADAPTED.

The existing retort house was a well-constructed commodious building erected in 1900. It was, with slight alterations, quite suitable for housing the new installation. The walls were raised 5 ft., and the roof was reconditioned. Consequent on the removal of buildings which had been continuous with the retort house, a new steel and brick gable end was constructed facing the offices and coke screens. Originally intended for a make of 1 million c.ft., the building now contains a plant of a daily capacity of 1¼ millions, and with the eventual addition of the further eight vertical retorts for which provision is made, it will be able to produce 1¾ millions per day.

UNIQUE COAL CONVEYOR.

Before describing the new carbonizing plant, I would refer to a unique feature of the works—viz., the coal-handling plant erected in 1907 by Messrs. W. J. Jenkins & Co., Ltd., of Retford, and due, in the first place, to the late Chairman of the Gas Committee, Mr. T. H. Booth. The coal wagons are diverted from the main line into a short siding running from the neighbouring station along the south-eastern side of the works. The sidings level is 20 ft. below the works yard, and between them is a main road. From the yard to the top of the central hopper is a further 32 ft. 6 in., making a total of 52 ft. 6 in. through which the coal has to be raised to feed the lip-bucket conveyor. The wagons pass over a weighbridge and thence to a mechanical wagon-tipper by means of which the



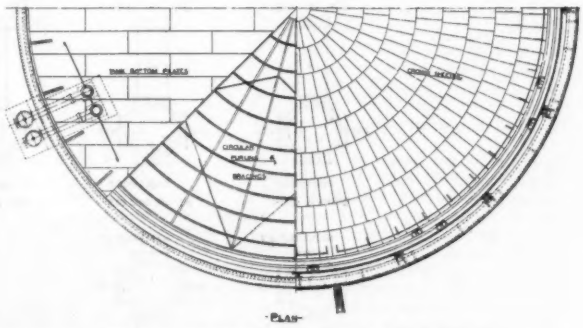


FIG. 5.—ARRANGEMENT OF GASHOLDER

coal is discharged into a double-claw breaker. An enclosed band conveyor set at an angle of 23° carries the coal in a tunnel under the road up into the roof of the store, and thence either to the stores which lie along that side of the retort house or to the large hopper supported at the ground level between the present two benches of verticals. This is a most important feature of our working, as will presently be described. The inclined coal conveyor has been kept in efficient working order. Re-

pairs and renewals have been very low; the coal hopper on the siding being renewed in 1927 for the first time.

No. 1 Bench of Verticals.

The first setting of verticals consists of twelve Glover-West retorts, elliptical in cross section, 33 in. by 10 in. at the top, enlarging to the base where each is extended into a circular steaming chamber; the whole being 25 ft. in length. There are six retorts to each producer, the same being in units of two with control dampers so arranged as to facilitate the working either of the complete installation or of a bed of six retorts. The retort fittings are those usually installed with the Glover-West retorts. The producers are of the step-grate type left open to the air for free access of primary air to the furnaces. The installation was guaranteed to produce 720,000 c.ft. of gas per day of a calorific value of 460 B.Th.U. gross. We have made, in 24 hours, 860,000 c.ft. of gas at a calorific value of 460 B.Th.U.

The bench is encircled by a lip-bucket conveyor. The buckets are placed on an endless chain which passes below the retort-house floor, receiving coke as discharged direct from the retorts, conveying it up to the end of the retort bench and out over the exhauster house, just beyond which the coke is delivered to a rotary screen. The chain then passes back to the retort house, up to and over the top of the storage bunkers above the retort bench, and then down again to the floor of the house. Coal is fed to the buckets from a chute of the large central 40-ton coal hopper near the ground level, just referred to, and is conveyed and delivered to the coal-storage bunkers over the retorts.

Coke Plant.

The coke is stored in a battery of hoppers constructed in a combination of steel cones lined with hard bricks and steel framework with hard brick filling. The total capacity is 40 tons. Coke is delivered from the conveyor to a rotary screen which divides it into breeze through ⅜-in. diameter perforations, small coke through 1½ in. diameter, nuts through 2¼ in. diameter, and large coke remaining. Five doors are provided in the bottom of the cones for the supply direct to vehicles, while there are four chutes, one to each size, with measuring chambers and clips for supplying coke to sacks.

Steam Raising.

Steam is raised in three ways:

(*a*) By burning breeze in a Cornish boiler capable of evaporating 140 gallons of water per hour.

(*b*) In a Spencer-Bonecourt gas-fired boiler of 300 gallons per hour capacity.

(*c*) In two West-Galloway water-tube boilers heated by the waste gases from the retort settings, each capable of evaporating 100 gallons of water per hour.

The Spencer-Bonecourt boiler is supplied with gas from a 6-in. main to a burner in front of each of its 84 tubes. The flames and combustion products are drawn through the tubes by a fan driven normally from the line shaft of the coke extractors of the retort bench, and, as a stand-by, by an electric motor. The waste-heat boilers are operated on natural draught; and by means of by-pass dampers the waste gases can pass away by the chimneys when the boilers are shut down.

Cold water from the town mains is delivered to the condensers. Passing through these it is heated to about 150° Fahr. and passes to the boiler storage tank which forms the roof of the boiler house. The condensers form a syphon, from the top of which heated water returns to the boiler storage tank, a supply for the boilers being taken off on the way by two pumps, each of 400 gallons per hour capacity. The feed to all boilers is automatically regulated by a "Thermofeed" regulator.

The town water is of unusually good quality and soft, and gives good service in the boilers. With the aid of a little boiler solution, the boilers go for a year without needing to be scaled.

There is thus a very complete system of economical steam raising; the gas-fired boiler being the stand-by that can be put into operation in a very few minutes as required. Eventually surface and rain water, caught on the works and stored in an existing underground holder tank 80 ft. in diameter and 20 ft. deep, will be used for all works purposes except drinking. The waste-heat boilers are the main source of steam, and are kept at 70 lbs. pressure; the breeze boiler being kept under fire, with the gas-fired boiler as a stand-by. Economy of steam is secured by judicious control in letting-down and cutting-off; any spare steam being sent through pipes to warm up the new stores.

The two vertical water-tube condensers, built by Messrs. R. & J. Dempster, are each of half-a-million c.ft. daily capacity, and have been so designed and arranged that they can be operated in nine different ways, thus combining flexibility and economy of operation. See fig. 6.

The Vertical Installation Justifies Itself.

Eleven months after these vertical retorts were put into operation, a further report was submitted to the Gas Committee giving them among other items the following facts about their working during the 33 weeks ended Aug. 15, 1925, compared with the corresponding period of the previous year, when the old inclines were working:

Gas made for 33 weeks ended—

Aug. 15, 1925	102,288,000 c.ft.
,, 16, 1924	88,776,000 ,,

(This shows an increase of 15·22 p.ct.)

Total Wages paid for 33 weeks ended—

	£ s. d.
Aug. 15, 1925	3555 4 7
,, 16, 1924	3737 12 4

(This shows a decrease of £182 7s. 9d., or nearly 5 p.ct.)

Total Wages paid per 1000 c.ft. for 33 weeks ended—

	d.
Aug. 15, 1925	8·341
,, 16, 1924	9·991

(A decrease of 1·65d. per 1000 c.ft., or 16·5 p.ct.)

(During the 33 weeks of 1925, all employees received ½d. per hour more than in 1924.)

The general working result of the new plant compared with the old was summed up as follows:

—	Inclines.	Verticals.
Average yield of 460 B.Th.U. gas per ton of coal	14,000 c.ft.	19,000 c.ft.
Average yield of tar per ton of coal	10½ galls.	16 galls.
Liquor, 10-oz. strength, per ton	30 ,,	40 ,,
Saleable coke	8¼ cwt.	7¼ cwt.

The lower weight of saleable coke per ton of coal from the verticals is due partly to steaming, and partly and especially to the fact that it is dry coke, as no water is used for quenching it.

No. 2 Bench of Verticals Recommended.

It was then recommended that steps should be taken forthwith to replace the remainder of the unused and worn-out bench

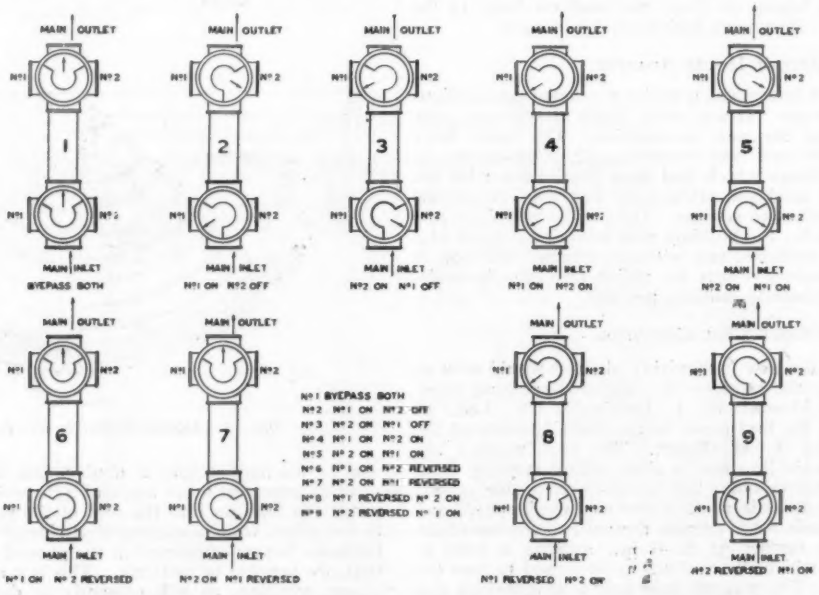


FIG. 6.—DIAGRAM SHOWING WORKING OF VALVES TO WATER CONDENSERS.

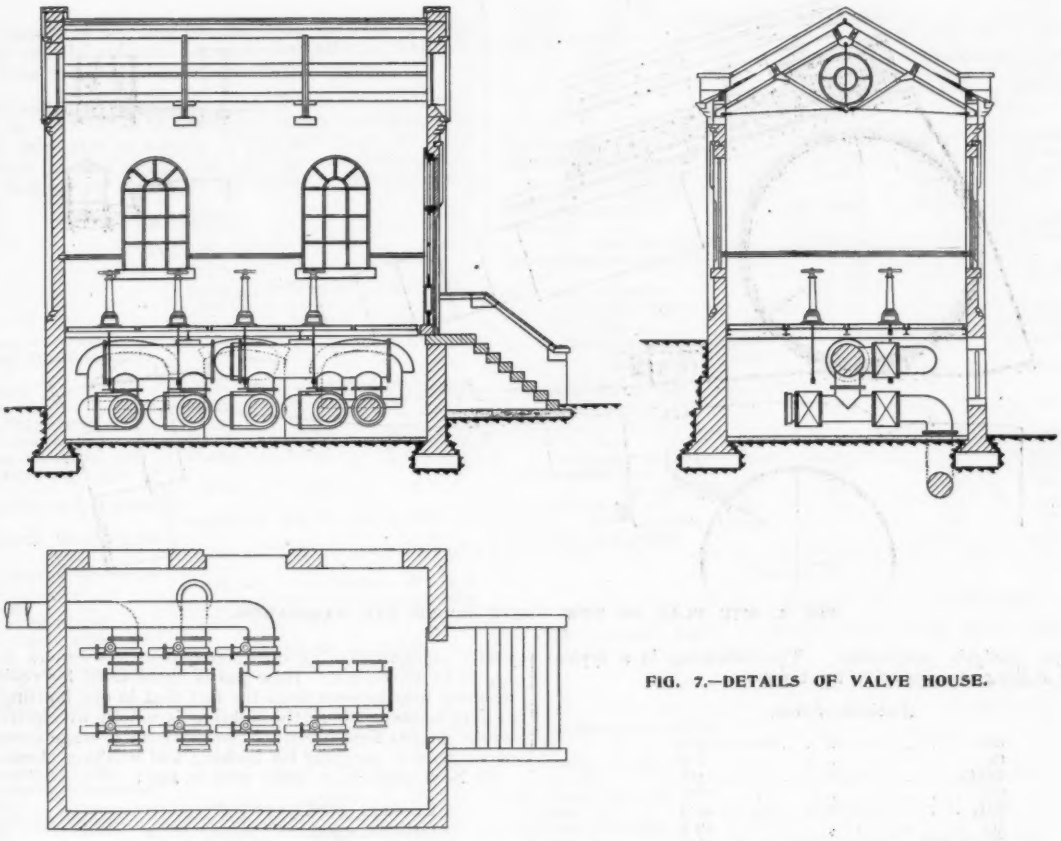


FIG. 7.—DETAILS OF VALVE HOUSE.

of forty inclined retorts of the nominal capacity of 600,000 c.ft. per day by eight more vertical retorts of a nominal capacity of 500,000 c.ft. In support of this recommendation, it was pointed out that in 1905 the Council had deemed it necessary to extend the carbonizing plant to a nominal capacity of 1 million c.ft. per day, while in 1925, with double the sales of gas obtained in 1905, the sole reliable and effective carbonizing plant (the verticals) was only designed to give 720,000 c.ft. per day, and that no stand-by plant was available when these verticals came due for repairs. There had been an increase of 13·4 p.ct. in gas consumption from March to September, 1925, and on six different days during the previous winter the daily demand had exceeded the guaranteed output of the vertical retort plant. Fortunately the flexibility of the latter is such that, by judicious selection of coals and careful attention to adjustments, it had always been possible to keep on the top side of the maximum demand for a sufficient length of time.

It was recommended that the skeleton framework of yet another eight retorts should be erected, with the necessary coke and coal handling plant. The cost of the work recommended was estimated at £13,530; the ultimate eight retorts eventually costing perhaps another £6500.

The Council approved of this scheme, and the Ministry of Health, without holding an inquiry, gave their consent to the scheme and for a loan of £13,500. Owing to the industrial dislocation occasioned by the coal stoppage of 1926, the work was delayed, and the new retorts were not started until the second week of April, 1927. This brought the plant to its present form; the debt outstanding on March 31, 1927, being £74,944, with an output of 174 millions per annum, standing capital charges being 9d. per 1000 c.ft. of gas sold.

WORKING AND RESULTS DURING THE COAL STOPPAGE.

Of the year 1926-27 I need say very little. During the coal stoppage we had to use American, Silesian, and Derbyshire coals, and several hundred tons of Footrill slack. The yields suffered, and the plant had to be worked to its full capacity to pull through the winter. A more difficult and anxious twelve months none of us has ever experienced. But the men throughout gave every assistance, and we were able to avoid any failure of gas supply, in spite of inferior coals and inadequate plant.

I have given in an appendix to this address the working results of 1926-27, which are, of course, much below what would have been secured under normal conditions. The financial details are so unrepresentative that no good purpose would be served by considering them at length. Suffice it to say that there was a net loss of £1318 on the year's working, swollen to £1768 after contributing £450 in relief of rates. This was not a bad result, I think, with coal costing 41s. 3d. per ton on an average for the year, the gas being sold at 3s. 4d. net per 1000 c.ft.

May I now turn aside, and describe a few features of the working of the present plant?

WORKING OF THE COAL AND COKE HANDLING PLANT.

The coal and coke handling plant has already been described. Its actual routine working is as follows: About 8 a.m. the coke is first discharged from the base of the retorts on to the conveyor, and cleared away to the coke screens and hoppers. This takes about ten minutes. Then the coal from the full central hopper on the retort floor is delivered into the conveyor and transferred to the overhead bunkers. This takes about forty minutes. At about 9 a.m. we begin to take coal from the wagons in the siding by means of the inclined conveyor and with it fill the central hopper. This takes about two hours. No coal is taken from the wagons on Sunday; that day's stock being taken from the central hopper, which is then left empty. On Monday morning a double lot of coal has to be taken up. First the central hopper is filled. This coal is then transferred to the overhead bunkers, and the central hopper is filled again. During the week we always have a day's stock in reserve there, in case anything goes wrong with the conveyor, or the wagons fail to arrive. There is also a bucket elevator as a stand-by to take coal from stock to the overhead bunkers.

ALL COKE SOLD LOCALLY.

Mention has already been made of our control of the coke market. We are not only able to sell all our own coke locally, but we have systematically to buy coke from other towns to enable us to supply the local demands. Consequently, though our coke hoppers can hold forty tons of coke, we have as a rule a mere handful in stock. The quality of the coke is an important factor in maintaining this happy state of affairs. In choosing our coal we have borne in mind the necessity of producing a good coke; and as it comes cool from the retort chambers, it is dry, open in texture, and burns easily. We are sometimes troubled with coke dumped in our district at a lower price than we charge; but our customers soon find the difference in moisture content, ash, and ignitability.

CONTINUOUS CALORIMETER RECORDS.

The calorific value of our gas is continuously tested and recorded, and the Simmance & Abady recording calorimeter is daily checked by a Boys calorimeter. Monthly charts giving a continuous record are in use and are subsequently filed. This procedure was adopted four years before the passing of the Gas Regulation Act of 1920. This record supplements the monthly return to the Gas Committee, of which form I give a recent specimen.

We have also installed in our laboratory a Kent-Smith com-

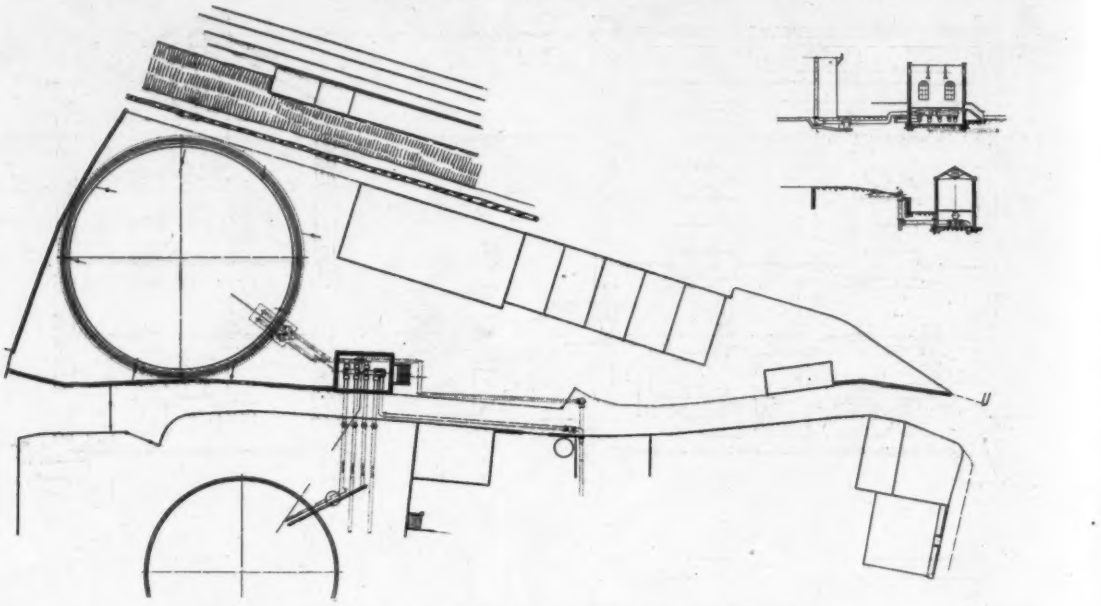


FIG. 8.—SITE PLAN OF NEW VALVE HOUSE AND GASHOLDER.

plete gas analysis apparatus. The following is a typical analysis of the gas supplied to the town:

Analysis of Gas.

	P.Ct.
CO_2	4·6
O_2	0·6
C_nH_m	1·8
CO	16·4
CH_4	20·4
H_2	49·6
N_2 (by diff.)	6·6
	100·0

Calculated calorific value = 461·47 B.Th.U.

Other Plant.

To round off my description of the works, I may add a few words about the other plant.

Washers.—There is a tower-scrubber filled with wood grids, capable of dealing with 1 million c.ft. daily. It has a Livesey washer at the base. There is also a Holmes rotary washer-scrubber of 1 million c.ft. daily capacity, steam driven.

Purifiers.—There are four boxes 30 ft. by 30 ft. by 5 ft., worked on the backward rotation, gas passing up through the boxes. On an average three boxes per annum are emptied and filled. At present the oxide is revivified partly in the open; but the shed covering the boxes is to be extended so that the revivifying oxide may be sheltered. The cost of purification is 0·15d. per 1000 c.ft. on the average of twelve years' working. No trouble is experienced with naphthalene, and no special steps are taken to remove it from the gas; this being unnecessary with continuous vertical retorts.

Low Labour Costs.

In all these plans for dealing with the manufacturing plant, the desirability of reducing the labour to something near the absolute minimum was steadily kept in view; and it is claimed that the object has been attained. For a make which is now 174 million c.ft. a year, and a maximum day's output which has reached 800,000 c.ft., we work ordinarily with two men per shift. One operates the retorts top and bottom; and the other attends to boilers, exhausters, pumps, governors, and telephone, changes the holders, and generally acts as yard watchman. For six weeks during winter, one extra man is provided at night in case of need. While, immediately prior to the war, manufacturing wages amounted to 1·85d. per 1000 c.ft., they are now, despite the greatly enhanced rate of wages and reduced hours, only 1·619d. per 1000 c.ft.

Results.

In the appendix to this address I have given the working results of our present plant. As already remarked, the 1926-27 figures are much below normal on account of the disturbing influence of coal stoppage conditions, but I have reproduced the figures of 1925-26 giving the first complete twelve months' working of the first and major part of the vertical retort installation, starting when it had been in operation for 4½ months and was working normally.

Distribution Figures.

On the distribution side of the undertaking I need say but little. Last May we had 2234 ordinary meter consumers and 2723 prepayment meter consumers. I have seen the average yearly consumption of our prepayment consumers rise from 13,000 to 26,000 c.ft. How gas is appreciated for cooking and washing may be seen from the fact that in one housing scheme of fifty houses, where the lighting is wholly by electricity and where no gas fires are fixed, we have an average consumption of 26,300 c.ft. per year for cooking and washing alone.

In November, 1927, there were in use:

Cookers, 2676.
Grillers, 1369.
Wash-coppers, 901.
Fires, 837.
Public-lamps, 440.

All the public lighting is by gas, and brings in £1500 a year.

All the lamps are operated by automatic clock apparatus.

We have a small showroom in the Market Place where complaints and coke accounts can be handled. Some little time back we completed a census of consumers' appliances, and we now have a maintenance scheme in operation doing good work.

New Scale of Charges.

In 1927 the Committee adopted a more uniform scale of charges for gas. For over 25 years there had been extra discounts, ranging from 5 to 20 p.ct. on gas used for power. The new scale does away with all distinctions as to the uses to which the gas is put, and gives increasing discounts as the consumption passes certain limits. At the prices then ruling, the scheme gave net prices ranging from 3s. 3·35d. down to 2s. 6·7d. per 1000 c.ft.

New Scale of Charges for Gas, to Apply to each Separate Meter Installed on the Consumers' Premises.

[Basic price of gas 3s. 3d. per 1000 C.Ft. Net.]

		Per 1000 C.Ft. s. d.
For the first 20,000 c.ft. per quarter	. . . . .	3 9 *less* 12½ p.ct.
,, excess consumption over 20,000 up to	35,000 c.ft.	3 7 ,, ,, ,,
,, ,, ,, 35,000 ,,	50,000 ,,	3 5 ,, ,, ,,
,, ,, ,, 50,000 ,,	70,000 ,,	3 3 ,, ,, ,,
,, ,, ,, 70,000 ,,	100,000 ,,	3 1 ,, ,, ,,
,, ,, ,, 100,000 ,,	150,000 ,,	2 11 ,, ,, ,,
,, ,, ,, 150,000 ,,	200,000 ,,	2 9 ,, ,, ,,
,, all consumption ,, 200,000	. . . . .	2 7 ,, ,, ,,

The following example shows the effect of such charges:

C.Ft. of Gas.		£ s. d.		£ s. d.	Per 1000 C.Ft. s. d.
20,000 at 3s. 9d.	=	3 15 0	*less* 12½ p.ct. =	3 5 7	= 3 3·35
35,000 ,,	=	6 8 9	,, ,, =	5 12 8	= 3 2·63
50,000 ,,	=	9 0 0	,, ,, =	7 17 6	= 3 1·8
70,000 ,,	=	12 5 0	,, ,, =	10 14 4	= 3 0·74
100,000 ,,	=	16 17 6	,, ,, =	14 15 4	= 2 11·44
150,000 ,,	=	24 3 4	,, ,, =	21 2 11	= 2 9·83
200,000 ,,	=	31 0 10	,, ,, =	27 3 3	= 2 8·595
250,000 ,,	=	37 10 0	,, ,, =	32 16 3	= 2 7·5
300,000 ,,	=	43 19 2	,, ,, =	38 9 4	= 2 6·7

98 p.ct. of the consumers avail themselves of this discount; the system ensuring the payment of accounts within 28 days.

Conclusion.

The drawings and tables give details of the arrangement of the works and the results obtained. Table A is extracted from the "Gas World" Analysis of Municipal Gas Accounts,

showing the results of working for the years 1913-14, 1925-26, and 1926-27 in parallel columns for easy comparison. Table B is extracted from a recent monthly gas-works report.

I trust you will find this information of interest, and, perhaps, of use to you. If in this account of my experiences at Leek I have been able to convey to you any hints for your guidance, points for your study, and facts for your information, I shall have been amply repaid for my labour in compiling it.

APPENDIXES.

TABLE A.

—	Pre-War. 1913-1914.	Normal. 1925-1926	Coal Stoppage. 1926-1927.
Carbonizing and Distribution Results—			
Coal carbonized	10,267 tons	9,640 tons	10,241 tons
Gas made, thousands	116,537	171,884	173,851
,, ,, per ton of coal, c ft.	11,350	19,013	16,976
,, sold, thousands	104,253	156,894	161,380
,, ,, per ton of coal, c.ft.	10,154	17,355	15,758
,, unaccounted for, p.ct. on make	8·6	5·7	4·3
,, unaccounted for, per mile of main	420,666 c.ft.	328,200 c.ft.	251,700 c.ft.
Coke and breeze available for sale, total	4,198 tons	3,198 tons	3,303 tons
Coke and breeze available per ton of coal	8·2 cwts.	7·1 cwts.	6·5 cwts.
Tar made, total	109,834 galls.	157,873 galls.	144,041 galls.
,, ,, per ton of coal	10·7 ,,	17·5 ,,	14·1 ,,
Ammoniacal liquor made, total 10 oz.	213,505 ,,	277,476 ,,	296,691 ,,
Ammoniacal liquor per ton of coal	20·8 ,,	30·7 ,,	29·0 ,,
Gas and Meter Rentals—			
Gas (*less* public lamp charges), amount	£11,323	£23,583	£28,233
Gas, per 1000 c.ft. sold	2s. 2·07d.	3s. 0·07d.	3s. 5·99d.
Meters, amount	..	£73	£82
,, per 1000 c.ft. sold	..	0·11d.	0·12d.
Receipts from Residual Products—			
Coke, amount	£2,440	£3,900	£5,609
,, per 1000 c.ft. sold	5·62d.	5·97d.	8·34d.
Tar, amount	£1,074	£1,388	£2,099
,, per 1000 c.ft. sold	2·47d.	2·12d.	3·12d.
Ammonia products, amount	£664	£2	£27
,, ,, per 1000 c.ft. sold	1·53d.	0·00d.	0·04d.
Total per 1000 c.ft. sold	9·62d.	8·09d.	11·50d.
Receipts from stoves and fittings, amount	£567	£2,630	£2,980
Receipts from stoves and fittings, per 1000 c.ft. sold	1·31d.	4·02d.	4·43d.
Miscellaneous receipts, amount	£356	..	..
,, ,, per 1000 c.ft. sold	0·82d.	..	..
Total revenue (*less* public lamp charges), amount	£16,424	£31,572	£39,030
Total revenue per 1000 c.ft. sold	3s. 1·82d.	4s. 0·29d.	4s. 10·04d.
Manufacturing Charges—			
Coal, amount	£8,138	£11,818	£21,142
,, per ton of coal	15s. 10·23d.	26s. 1·75d.	41s. 3·46d.
,, ,, 1000 c.ft. sold	1s. 6·73d.	1s. 6·08d.	2s. 7·44d.
,, *less* residuals per ton of coal	7s. 8·56d.	14s. 5·42d.	26s. 2·19d.
,, per 1000 c.ft. sold	9·11d.	9·99d.	19·94d.
Purification, amount	£117	£200	£129
,, per 1000 c.ft. sold	0·27d.	0·31d.	0·19d.
Salaries, amount	£355	£1,160	£1,070
,, per 1000 c.ft. sold	0·82d.	1·77d.	1·59d.
Wages, amount	£804	£1,058	£1,160
,, per 1000 c.ft. sold	1·85d.	1·62d.	1·72d.
Maintenance, amount	£1,089	£2,863	£2,466
,, per 1000 c.ft. sold	2·51d.	4·38d.	3·67d.
Gross cost of gas in holders, per 1000 c.ft. sold	24·18d.	26·16d.	38·61d.
Net cost of gas in holders, per 1000 c.ft. sold	14·56d.	18·07d.	27·11d.
Rates and taxes, amount	£552	£921	£1,033
,, ,, ,, per 1000 c.ft. sold	1·27d.	1·41d.	1·54d.
Distribution Charges—			
Salaries, amount	£310	£1,190	£1,253
,, per 1000 c.ft. sold	0·71d.	1·82d.	1·86d.
Maintenance of pipes, amount	£523	£1,513	£1,553
,, ,, ,, per 1000 c.ft. sold	1·20d.	2·31d.	2·31d.
Maintenance of meters, amount	£337	£569	£600
,, ,, ,, per 1000 c.ft. sold	0·78d.	0·87d.	0·89d.
Total per 1000 c.ft. sold	2·69d.	5·00d.	5·06d.
Management Charges—			
Salaries, amount	£172	£335	£355
,, per 1000 c.ft. sold	0·40d.	0·51d.	0·50d.
Stationery, printing, and general charges, amount	£248	£338	£462
Stationery, printing, and general charges, per 1000 c.ft. sold	0·57d.	0·52d.	0·69d.
Total per 1000 c.ft. sold	0·97d.	1·03d.	1·19d.
Bad debts, amount	..	..	..
,, ,, per 1000 c.ft. sold	..	..	..
Maintenance of stoves and fittings, amount	£611	£2,609	£3,141
Maintenance of stoves and fittings, per 1000 c.ft. sold	1·41d.	3·99d.	4·67d.
Total expenditure, amount	£13,256	£24,574	£34,344
,, ,, per 1000 c.ft. sold	2s. 6·52d.	3s. 1·59d.	4s. 3·07d.
,, ,, p.ct. on income	£80·7	£77·8	£88·0
Net cost of gas per 1000 c.ft. sold after deducting residuals, stoves, and fittings	1s. 6·77d.	2s. 1·48d.	2s. 11·14d.

TABLE A (*continued*).

—	Pre-War. 1913-1914.	Normal. 1925-1926.	Coal Stoppage. 1926-1927.
Gross profit	£3,168	£6,998	£4,686
Capital charges, amount	£2,560	£6,237	£6,004
,, ,, per 1000 c.ft. sold	5·90d.	9·54d.	8·93d.
,, ,, p.ct. on book values	..	5·2	4·6
+ Surplus, amount	+ £608	+ £761	..
− Deficit ,,	..	..	− £1,318
Per 1000 c.ft. sold	+1·40d.	+1·16d.	− 1·96d.
Outstanding debts, per million c.ft. sold	..	£491	£465
Particulars of Debt—			
Interest bearing debt	..	£76,733	£74,944
Total capital	..	£76,733	£74,944
Book value of undertaking, amount	..	£118,157	£129,057
,, ,, ,, per ton of coal	..	£13 18s. 5d.	£12 12s.
Book value of undertaking, per 1000 c.ft. sold	..	15s. 1d.	16s.
Distribution Details—			
Main mileage	24	30	30
Gas sold per mile of main, thou.	4,344	5,230	5,379
Consumers, total	4,238	4,858	4,989
,, per mile of main	176	162	166
Public lamps, total	394	435	443
,, ,, per mile of main	16	14	15
Cookers and grillers	..	3,812	4,123

TABLE B.

Leek Urban District Council—Gas Department.

Gas Manager's Report for the Five Weeks Ended Jan. 7, 1928.

—	1928.	1927.	Increase.	Decrease.	Per-centage.
Gas made five weeks, c.ft.	21,844,000	21,841,000	3,000	..	·01
Gas made to date, total c.ft.	126,540,000	127,885,000	..	1,345,000	1·05
Gas sent out five weeks, c.ft.	22,176,577	22,088,163	88,414	..	·40
Gas sent out to date, total c.ft.	126,773,149	127,880,552	..	1,107,403	·86
Gas made per ton, c.ft.	18,686	16,749	1,937	..	11·56
Heat units per ton (gross)	8,502,130	7,620,795	881,335	..	11·56
Gas coal in stock, tons	1,100	601	499	..	83·02
Coke in stock, tons	5	10	..	5	50·00
Coke used in manufacture, tons	242	228	14	..	6·14
Coke and breeze sold, tons	570 5 cwt.	511 0 cwt.	59 5 cwt.	..	11·59
Coke and breeze sold to date, tons	2,415 12 cwt.	2,425 7 cwt.	..	9 15 cwt.	·402
Wages paid	£ 581 18 8	£ 583 17 0	£	£ 1 18 4	·32
Wages paid to date	£4,688 5 1	£4,764 3 6	£	£75 18 5	1·60
Average gross calorific value, B.Th.U.	455	455	..	..	..

DISTRIBUTION DEPARTMENT.

NEW MAINS.	ROAD.	LENGTH.

NEW SERVICES.

10, Hall's Avenue. H.S. . . 211 ft. of 1½ in. and 50 ft. of 1 in. pipe.
,, ,, ,, ... 86 ,, 1½ ,, ,, ,, ,, ,,
1, Black Acres . . . . . 144 ,, 1 ,,
1, Stockwell Street. . . . 22 ,, 1 ,,
1, Sheep Market . . . . 35 ,, 1½ ,,
1, Rosebank Street. . . . 70 ,, ¾ ,,

SERVICES RENEWED.

7, Novi Lane . . 137 ft. of ¾ in.		1, Wellington Street	17 ft. of ¾ in.
1, Vicarage Road . 12 ,, ,, ¾ ,,		1, St. Edward Street	11 ,, ,, ¾ ,,
1, Park Lodge . . 36 ,, ,, ¾ ,,		1, Junction Road .	9 ,, ,, ¾ ,,
7, Ballhaye Green . 14 ,, ,, ¾ ,,		1, Waterloo Street .	13 ,, ,, ¾ ,,
,, ,, . 87 ,, ,, 1¼ ,,		2, Chorley Street .	24 ,, ,, ¾ ,,
1, Spencer Avenue . 36 ,, ,, 1 ,,		1, King Street . .	11 ,, ,, ¾ ,,
1, Cruso Street . 12 ,, ,, ¾ ,,		3, Mill Street . .	21 ,, ,, ¾ ,,

Ordinary meters fixed	49	Brought out, 52	Net decrease, 3
Slot meters fixed . .	59	,, 55	Net increase, 4
Hired cookers fixed .	20	,, 16	Net increase, 4
Hired fires fixed . .	2	,, 1	Net increase, 1
Hire-purchase cookers	3	,, ..	Net increase, 3
Hire-purchase boilers	1	,, ..	Net increase, 1
Hired grillers . . .	13	,, 17	Net decrease, 4
Hire-purchase fires .	3	,, ..	Net increase, 3

Purchased: 4 cookers, 13 gas fires, 9 wash boilers, 2 radiators, and 1 syphon stove.

RD. H. GINMAN, Engineer and Manager.

Mr. H. E. BLOOR (York), moving a vote of thanks to the President for his address, said it was his good fortune many years ago to have Mr. Ginman as his general Works Foreman

—the most loyal, enthusiastic, and successful man of whom he had had experience in that position; and he had since been under a sense of obligation to Mr. Ginman for the assistance then given. Mr. Ginman gave close, concentrated study to every detail of the work which came under his control; and he was a born organizer. All of them would gain by studying the figures which had been put into their hands.

Mr. A. L. JENNINGS (Cleckheaton) remarked that this was one of the most interesting contributions made to a meeting of the Institution since he became a member of it. The carbonizing figures were exceedingly good, and would arouse the envy of others who had vertical plants but were not able to obtain similar results. Anyone who had had experience of designing new work or increasing productive capacity knew the difficulties which Mr. Ginman had overcome; the problem could not have been solved more ably.

The vote of thanks was cordially passed, and the PRESIDENT returned thanks.

A VALUABLE VISIT.

The PRESIDENT said the official records of the Institution ought to contain some recognition of the hospitality of Messrs. Parkinson & Cowan (Gas Meters), Ltd., and he moved that a vote of thanks be passed to the firm. The visit had been most educational and instructive, and had revealed to the members how the firm had laid themselves out to meet the needs of the gas industry in a way which should benefit gas engineers as well as themselves.

Mr. R. WATSON (Doncaster) seconded the motion. He remarked that the information they had gained would be of great service; and they were particularly indebted to Mr. Franklin Thorp, who had considerable scientific ability, and had helped them in other ways, as well as in regard to meters.

The vote of thanks was passed unanimously.

Mr. COWLISHAW said the Leek Gas Committee were greatly pleased that the Institution had selected Mr. Ginman, their Engineer and Manager, to be the President. They felt that it reflected honour on the undertaking and the town. Since he took over the gas-works in 1914, there had been a great improvement in efficiency; and they now felt that, though small in size, it was a model gas-works. The matter had not been definitely settled—owing to the illness of the Chairman of the Committee, it had not yet gone through to the Council—but they hoped to invite the Institution to visit Leek in the summer.

Mr. E. H. HUDSON (Normanton) moved a vote of thanks to the Secretary and other officials, which was carried unanimously, and acknowledged by Mr. ROGERSON.

The members were entertained at tea in the Midland Hotel by Messrs. Parkinson & Cowan (Gas Meters), Ltd.

THE VICTORY WORKS OF MESSRS. PARKINSON & COWAN (GAS METERS), LTD.

Victory Works, Stretford, Manchester, one of the latest additions to the 22 factories of Messrs. Parkinson & Cowan (Gas Meters), Ltd., and their associates, though of recent acquisition, and as yet only partially developed, already employ over 400 workpeople.

The main shop is a one-storied building, with a floor area of 60,000 c.ft. Artificial lighting is by small high-pressure gas-lamps for spot lighting, and by large low-pressure gas-lamps for general illumination. An engineers' shop, complete with travelling crane, has been added to the main shop, and a brass foundry has just been erected on the land available for extensions.

Gas is used for many purposes. Mixed gas and air under pressure is employed for lighting. High-pressure gas is used for tinmen's stoves and for the melting of tin and antimony, while low-pressure gas and high-pressure air are used for brass and copper melting. Thermostats control the temperature of the metal pots, to prevent deterioration of the metal. The consumption of gas—which, by the way, is supplied by the Stretford Gas Board—is about 12 million c.ft. per annum, and is rapidly increasing.

The first thing which attracts attention in the main workshop is the ideal conditions under which the employees work. Perfect lighting, ample air space, good ventilation, and orderly arrangement of machines, benches, and stores are factors which conduce to the high quality of the firm's products.

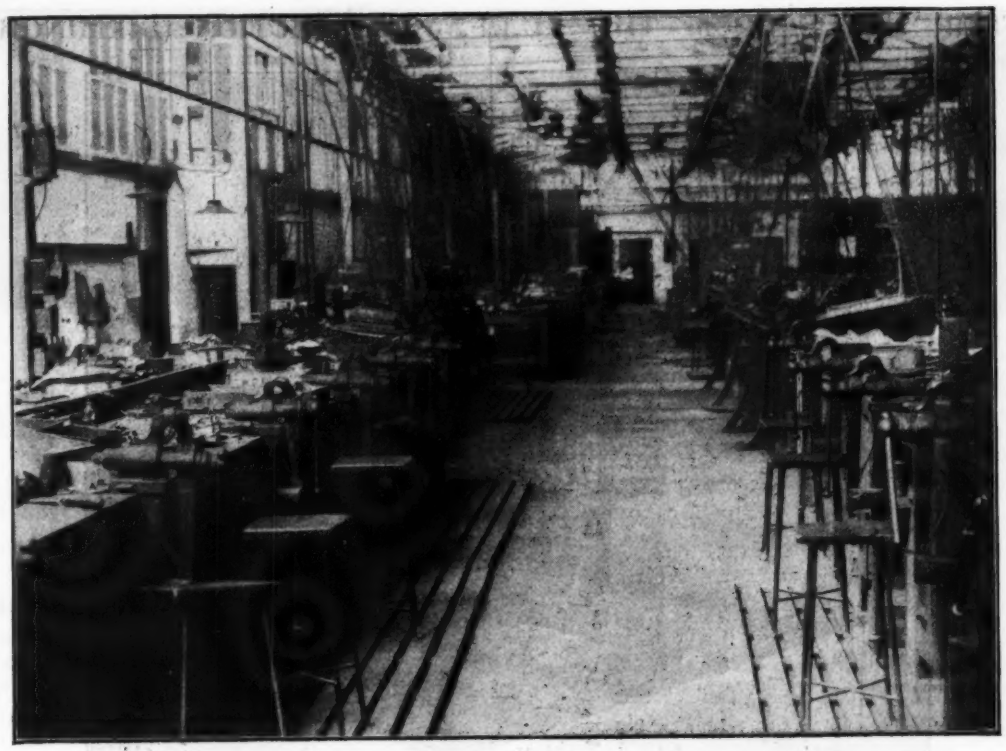
The works are divided into sections, each section being self-contained, and complete with foreman's office. The Works Manager's office is raised about 6 ft. from the shop floor-level, and commands a view of the whole works.

To enable the visitors to inspect the principal operations of meter making, &c., thoroughly, they were taken in small groups by various members of the staff. The manufacture of the component parts from the raw material to the finished product was shown. With regard to the tinned iron wet meter, the casing was seen from the black iron sheet through the cutting, stamping, rolling, and tinning processes to the complete meter. A notable feature of the Cowan tin "Duplex" wet meter is that the iron is tinned after all the stamping and bending is complete. The manufacture of drums was inspected from the ingot tin through the melting (by gas), casting, rolling, stamping, assembling, and soldering to the finished article. The brasswork was examined from the ingot brass through the moulding, casting, machining, and lacquering stages to the complete part; while the assembling, testing, and painting of meters were also witnessed.

The visitors also scrutinized corresponding details of the manufacture of tin dry meters, noting the careful testing of the leather diaphragms by strong light in a dark room, the casting of the valves and gratings, the tying of diaphragms, and the testing for tightness.

The firm make on their own premises all the parts of their meters. Having their own leather factory, brass and iron foundries, tin and white metal melting furnaces, enamelling works, and rolling mill, they are in the position of being able to guarantee the correct composition and manufacture of all component parts. Most of the brasswork is produced on automatic and capstan lathes, though for some of the hard brass shafts,

VIEW OF VICTORY WORKS.



GENERAL VIEW OF BRASS SHOP AND INDEX DEPARTMENTS.

worms, &c., hand lathes with special attachment are used. Stamping and drawing in power presses were watched with much interest, while the beautifully accurate work of press tools produced in the tool room was greatly admired by those present.

In the blacksmiths' shop the iron parts for station meter drums were being produced, and an annealing furnace heated by gas was at work.

Working models of various types of meter were on view; special interest being taken in the patent "Duplex" meter in many forms—*e.g.*, with spoon compensator, Crowther float (Liverpool pattern), Esson compensator (Sheffield pattern), and prepayment attachment having external valve-box and valve removable *in situ*. A new dry prepayment meter was another item of attraction. This has many important features, such as deep-rimmed diaphragms with large rounded edges to prevent the leather being cut, and an attachment which is detachable and convertible *in situ* to take 1d. or 1s., while the stop-valve box is large and the stop valve readily removable. A new type of diaphragm (Batt and Cairns patent) was exhibited, and its advantages were explained. A special attraction was a bench fitted with a new consumer's bell type meter supplying gas to a Parkinson gas-fire, and a new all-enamel Parkinson cooker. The gas passing was about 180 c.ft. an hour, and the loss in pressure through the meter was only about 3½-10ths. A new cast-iron dry meter of No. 2 size was supplying a cooker and wash boiler, and was passing about 200 c.ft. an hour, again with an absorption of about 3½-10ths pressure only. Another exhibit of a novel character was a new maximum demand indicator (the joint invention of Mr. Carr, of Stretford, and Mr. Thorp) which created much interest, as it is the first time that this type of apparatus has been applied to a gas meter.

Interest was also taken in the up-to-date arrangement of the store and packing departments. In the engineers' shop, the firm had arranged for the testing of a new bell type of station meter, which created a very favourable impression upon the visitors. The test was carried out by means of a large calibrated holder, which was claimed to be the largest testing plant of its kind in the country. By this holder, station meters of all kinds can be tested at their badged rates of flow up to 250,000 c.ft. per hour. Model governors of both station and retort-house types were also on view, while a new arrangement (Brown and Holton patent) for regulating pressures from a distance was seen in operation.

A "Duplex" drum of 9000 c.ft. per hour capacity, together with special spout, was shown; and the visitors noticed the small size of this drum compared with the ordinary type. This should be a boon to any gas undertaking whose present station meter is of insufficient capacity, as the existing case can be retained, and the expense of building a larger meter-house is avoided.

The new brass foundry which, when completed, will require some 6000 c.ft. of gas per hour for melting purposes, was also inspected.

The works are provided with kitchen and messrooms. A Welfare Committee, elected by the workpeople, runs the dining and refreshment departments, while the firm provide the cooking apparatus, gas, and assistance. A nurse is always in attendance; and the general welfare of the workpeople receives the firm's careful attention.

COAL AND BYE-PRODUCT EXPORTS.

Export business in the above did not start the year very well; but there is hopefulness that things will improve during the immediate weeks and continue to do so.

Coal Exports.

The total quantity of coal shipped during January was 3,904,700 tons, which compares with 4,092,879 tons in January, 1927, and 4,148,042 tons in January, 1926. The month's values for the three years were as follows: 1928, £3,074,096; 1927, £4,290,805; 1926, £3,821,336. In these quantities and values, gas coal was represented as follows: January, 1928, 452,240 tons; 1927, 556,910 tons; 1926, 562,516 tons. The values were: 1928, £345,078; 1927, £527,116; 1926, £459,835.

Gas Coke.

Business was done in gas coke abroad in January to the extent of 135,876 tons, which compares with 55,785 tons in January, 1927, and 137,751 tons in January, 1926. The values were: 1928, £139,672; 1927, £68,333; 1925, £139,832.

Tar Products.

The transactions in benzole in January were very small, and the same is the case in naphtha. Tar, oil, creosote, &c., were shipped to the aggregate amount of 4,826,006 gallons, which compares with 1,414,023 gallons in January, 1927; the respective values being £175,857 and £47,239. Coal tar pitch exported in January amounted to 28,213 tons, as against 21,485 tons in January, 1927; the respective values being: 1928, £115,067; 1927, £130,473.

Sulphate of Ammonia.

Sulphate of ammonia did better in January than in the corresponding month of last year; the amount exported being 28,201 tons, as compared with 8514 tons. The values were: January, 1928, £286,438; January, 1927, £97,193. The Dutch East Indies and Japan were our best customers in January; the former taking 11,085 tons, and the latter 8746 tons.

Imports of Gas Oil.

The returns show that during January 8,866,145 gallons of gas oil were received, as compared with 16,172,153 gallons in 1927. The value in January was £124,537, compared with £320,542 in January, 1927.

FURTHER NOTES FROM THE "B.I.F." GAS SECTION (BIRMINGHAM).

MELTHAM SILICA FIRE-BRICK COMPANY, LTD., DISPLAYED A LARGE ASSORTMENT OF THEIR SPECIALITIES.

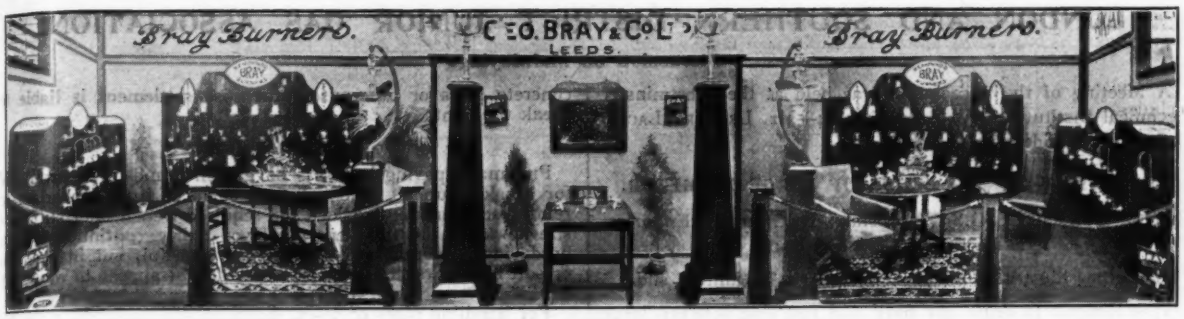
The eleven days' British Industries Fair at Birmingham (which was held simultaneously with the Fair at the White City) came to an end last Friday night.

EXHIBITION BUILDINGS TO BE EXTENDED.

The heavy section was a pronounced success, and in an official report, issued at the close by the authorities of the Fair, it is stated that shortly consideration will be given to a scheme for the enlargement of the exhibition buildings. It will be recalled that last year a huge building was erected to meet the demands of British manufacturers who desired to show their goods. A large proportion of the 900 exhibitors at the present Fair have applied for space at the Fair of 1929; and in some instances firms already having large stands have applied that the space to be allotted to them may be doubled. In addition, a large number of applications have been received from manufacturers who visited the Fair, but who were not exhibiting this year. Mr. G. N. Guest, President of the Birmingham Chamber of Commerce, who are responsible for the organization and management of the Fair, stated that plans have already been prepared with a view to immediate extensions. A lease has been secured from the Birmingham Corporation, who have given their active support to the Fair Management Committee, of 15 acres of land; and it is probable that buildings AA and B will be enlarged on the left-hand side from the entrance, to the extent of from three to four acres.

The attendance of home and overseas buyers showed a large increase on last year's figures. In the case of the latter the advance was officially estimated at fully 30 to 40 p.ct. The national and imperial character of the Fair was more marked this year than on any previous occasion; all British dominions being well represented. Inter-Empire trade, taken as a whole, showed remarkable progress. Not only was the actual amount of business done much larger, but the number of trade inquiries received was most substantial. The official estimate is that the total attendance was 130,000, which is approximately

CANNON IRON FOUNDRIES, LTD., SHOWED A WIDE RANGE OF GAS-HEATED APPLIANCES IN MODERN FINISHES.



GEORGE BRAY & CO., LTD.—A LIGHTING EXHIBIT OF UNUSUAL MERIT.

30,000 in advance of last year; and it is estimated by the authorities of the Fair that actual orders, largely of a preliminary character, were placed to the amount of 5¼ million pounds.

"SIGNET" COMBINATION GRATE.

Included in the apparatus shown by the Camelon Iron Company, Ltd., of Falkirk, was the "Signet" combination grate—which is provided with an alternative gas or coal oven, having a hot closet beneath. It has a swing canopy, with adjustable damper; and the hob extending over the oven and grate is fitted with two boiling rings. It is a strong and well made piece of apparatus, and created a good deal of interest among visitors to the Fair.

GAS SALESMEN IN BIRMINGHAM.

Invitations to all salesmen to participate in the programme primarily arranged for the British Industrial Gas Salesmen's Association for their meeting in Birmingham on March 2 met with ready response, and the meeting was an entire success. At ten o'clock the visitors assembled at the Offices of the City of Birmingham Gas Department, in the Council House, and were conveyed to the heat-treatment shops at the Windsor Street Gas-Works, which are in the charge of Dr. C. M. Walter. Here the processes of heat-treating non-ferrous metals, and of hardening and tempering steel tools, dies, &c., were demonstrated; and particular interest attached to a special demonstration of a new type of gas sealed muffle designed for the heat treatment of fine tools, moulding dies, and material in which the formation of oxide during the treatment must be avoided.

A visit to the Industrial Research Laboratories at the Windsor Street Works shows in no uncertain manner that the industrial field for the application of gas is an extraordinarily wide one, and that no gas undertaking of any considerable size can hope to cope with industrial business unless it has facilities for carrying out experiments and for demonstrating to manufacturers how gas can assist them. It is significant that since the Industrial Research Laboratories were brought into being in Birmingham the industrial load has developed rapidly. In the year ended March, 1911, the gas used for industrial heating represented 5·06 p.ct. of the total. quantity sold by the Department. In the twelve months ended March, 1913, the quantity was 6·95 p.ct. of the total. For 1925-26 the figure was 19·74 p.ct.; while for the six months ended September, 1927, the industrial load represented 23·42 p.ct. of the total output. In no other town or city in the United Kingdom are the uses to which gas is applied so varied as in Birmingham. At present, town gas is utilized in practically every trade in the district, covering many thousands of processes.

After inspecting the heat-treatment shops, the visitors were conveyed to the British Industries Fair at Castle Bromwich. Here the various bodies comprising the party—the British Industrial Gas Salesmen's Association, the Midland Gas Salesmen's Circle, the Midland Association of Gas Engineers and Managers, and the Institute of Public Cleansing—were entertained at luncheon by the Birmingham Chamber of Commerce and the Fair Management Committee.

Mr. G. N. GUEST (President of the Birmingham Chamber of Commerce), in proposing the toast of "The Visiting Associations," referred to the imposing display of the Gas Section at the Fair, which accupied an area of 15,000 sq. ft. Mr. STEPHEN LACEY (Deputy-Controller of Gas Sales to the Gas Light and Coke Company) replied on behalf of the three Gas Associations. He said the fact that in Birmingham the industrial load represented over 20 p.ct. of the total output of gas showed not only that Birmingham was an intelligent city, but also that their gas undertaking was splendidly managed, both technically and commercially. He also remarked on the excellent work which was being accomplished by the Gas Department in their Industrial Research Laboratories—work which indicated that the gas salesman was out to help the manufacturer to the utmost of his power. Mr. JAMES JACKSON, O.B.E. (President of the Institute of Public Cleansing), responded to the toast on behalf of the Institute.

It was originally arranged that, following the luncheon, Dr. Walter should give an address; but in view of the short time at disposal, it was thought desirable to leave the remainder of the day free for inspection of the many interesting exhibits at the Fair. To facilitate the tour of inspection, and to ensure that the time spent would be utilized to the best advantage, Dr. Walter had prepared a short but extremely useful description of the stand of the Birmingham Gas Department and of several other exhibitors who were showing gas furnaces of various patterns. The exhibits of interest to the gas industry have already been described in the "JOURNAL."

A full account of the day's proceedings will be published in the next issue of the "GAS SALESMAN."

THE "CERTUS" METER LUBRICATOR.

A Device of Great Utility.

In our account of the exhibits in the Gas Section of the British Industries Fair, Birmingham, which came to an end on Friday last, brief mention was made of the "Certus" oiling and greasing device for gas meters, shown on the stand of Messrs. George Wilson Gas Meters, Ltd., of Coventry.

Both the life and the accuracy of a dry meter depend on efficient lubrication; and as inaccuracy implies in most cases leaky stuffing boxes, it means a direct loss of revenue to the gas undertaking. The way to prevent this is to ensure an adequate supply of grease at the stuffing boxes. The other point which has to be watched in the working of a meter is the leather of the diaphragms, which cracks unless it is kept in a pliant and oiled condition. The need for attending to the lubrication of dry meters has become more urgent in these days, for the lubricating properties of gas, which formerly helped to maintain the working parts of the meter in good condition, have been largely eliminated.

The "Certus" device demonstrated by Messrs. George Wilson Gas Meters, Ltd., is ingenious and simple. On the front of the meter are the terminals of five tubes of narrow bore. The upper three of these are the grease tubes, and connect with the stuffing boxes of the meter. The lower two tubes are for oil, and connect with the front and rear leather diaphragms. The grease and the oil are forced into the meter by a gun; and the firm guarantee that in four hours the reconditioning of the meter will be complete—the leather will be uniformly and thoroughly lubricated, and there will be a slight coating of oil on all the moving parts.

An actual demonstration of the working of the "Certus" attachment showed the validity of the makers' claims; and there can be no doubt that it will be immensely valuable. The operation of oiling the meter is exceedingly simple, and can be performed *in situ* in a few moments.

Southern Association Programme.—The annual general meeting of the Southern Association of Gas Engineers and Managers will be held on Wednesday, March 28, at the Hotel Cecil, Strand, W.C., when the chair will be taken at 2.15. Mr. C. Valon Bennett, of Rochester, will deliver his Presidential Address; and this will be followed by the discussion (postponed from the November meeting) on Mr. Stephen Hay's paper, entitled "Some Notes on Horizontal Settings, with Special Reference to Silica Retorts." The discussion will be opened by Sir Arthur Duckham, K.C.B. Luncheon will be served in the hotel prior to the meeting; and tea will be provided at the close of the proceedings.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Discussion on Mainlaying.

A Meeting of the Association was held at the Westminster Technical Institute, S.W. 1, on Feb. 24—Mr. Leonard Lacey, B.Sc., the President, in the chair.

THE LAYING OF GAS MAINS OF LARGE DIAMETER.

By H. J. Escreet, B.Sc., Assistant Distributing Engineer, Gas Light and Coke Company.

[The author illustrated his paper by a series of lantern slides.]

It is difficult to draw any hard and fast line between large and small mains from the viewpoint of the difficulties experienced in laying them; and while, of course, I should not hesitate to describe a 4-in. main as small, or a 48-in. main as large, I cannot say that mains are small up to (say) 14 in. diameter, and large over that diameter.

The distinction between large and small mains which I have in mind is the number of obstacles met with in laying the main, and the way in which these obstacles are surmounted. Generally it is cheaper to divert other authorities' plant than to change the line of a large main, whereas a small main can easily be laid round or under any obstacles. Also the cost of diverting a given length of (say) 4-in. water main will be the same whether for laying a 36-in. or a 12-in. main; but as the 36-in. may cost £12 per yard, and the 12-in. £2 per yard, the cost of diversion as a percentage on the cost of changing the line of the new main is very much less for the 36-in. than for the 12-in. main.

Diversion of Pipes, Drains, and Cables.

The larger the main, of course, the greater the difficulty of finding room for it in a town road where there are already the service mains for gas and water, the sewers, and gulley and house drains. The greater depth required for laying large mains results in a considerable increase in the number of obstacles. For a cover of 2 ft. 6 in. a trench of 5 ft. 9 in. depth is required for a 36-in. main, while only 3 ft. 9 in. depth is required for a 12-in. main.

Though our standard depth is 2 ft. 6 in., it is usually necessary to lay rather deeper, at about 3 ft. 6 in. cover, if there are many side turnings from the road, as the main must cross under the service mains to these turnings. With a main of 36 in. or larger diameter, this depth usually means that the gulley drains come in the way, and must be diverted. Unless the sewer is shallow, the house drains will be low enough to clear the main.

It is often necessary to relay the smaller gas or water mains in order to obtain room for the large main. It is surprising how difficult it is to find the necessary four or five feet clear room in a road even if there are no large mains there already; but luck varies in this respect. In 1925, when laying five miles part 42-in., part 36-in. main from Islington to Swiss Cottage, we had to relay about two miles of gas and water mains, whereas in the four miles of 36-in. main from Kensal Green to Ealing Common, laid last year, only half-a-mile of small mains was relaid.

Where a large sewer is shallow and has to be crossed, it is often cheaper to adopt special means to get over it than to lay the main at the 10 or 12 ft. cover necessary to cross under. We have sometimes used a steel bridge pipe, flattened to elliptical section in the centre and turned down at the ends. An alternative, if 6 or 9 in. extra depth is all that is required to enable the main to be laid over, is to cut away the brickwork at the crown of the sewer, and insert a curved steel plate, making good to the brickwork with concrete. Needless to say, the permission of the local authority is necessary before this method of crossing the sewer can be adopted.

Main Road Crossings.

Where the main has to be laid across a road with tram tracks, it is usually necessary to drive a heading for at least the width of the two tracks, particularly if the trams are run on the conduit system. It is often better to make the heading rather longer, so that not more than one quarter of the width of the road is opened up, as this reduces the obstruction of traffic to a minimum. We lay steel tubes through these headings, instead of cast-iron pipes, and surround them with concrete; the chances of future escapes in these awkward places are thus reduced. The steel tubes are made in double flanged 10 ft. lengths, $\frac{3}{8}$ in. plate and $\frac{5}{8}$ in. flanges being used, the barrel of the tube welded and the flanges riveted to the barrel.

It is sometimes necessary to drive a heading across a main road even if there are no trams, owing to the number of pipes already laid in the road. A case in point is that of Holland Park Avenue, near Holland Road, where there are four 30-in., one 36-in., and one 18-in. water mains, as well as a 15-in. gas main and a large block of Post Office ducts. In crossing this road with the 36-in. Fulham-Kensal Green main in 1924, our heading was 15 ft. below road level (to floor of heading) and 88 ft. long. In rising to normal depth after a crossing of this kind, care must be taken to give good support to the bends, by concrete piers or otherwise, otherwise settlement is liable to break the joints.

Mainlaying Plant.

Pneumatic paving breakers have been found to be profitable for breaking-up all kinds of road surfaces from macadam to reinforced concrete, provided the required trench is of sufficient size to keep the breakers employed fairly continuously. In hard clay, pneumatic clay diggers are useful, but in medium or soft clay or ordinary ground they do not appear to have any advantage over the grafting tool or pick and shovel.

For handling pipes of 30-in. diameter and upwards, a gantry is generally used, and has many advantages over shearlegs. I have seen the gantry used for 18-in. pipes; but I consider that shearlegs are rather better for pipes up to 24-in. diameter.

If the ground is wet or otherwise at all treacherous, good timbering is essential when opening a large trench. Apart from the waste of time caused by a slip in the side of the trench, other pipes or cables may be damaged, and the area of paving to be reinstated is increased. For similar reasons, it is often necessary to leave some timber in the trench when filling-in. The extra cost of timber is small compared with the possible expense of reinstating half the road surface if subsidence causes cracks to develop in the crust.

My Company recently obtained two pipe-cutting machines, one for mains of 42-in. to 48-in. diameter, and the other for mains of 18-in. to 36-in. diameter. The two machines are by different makers, and I do not propose to describe them, as the advertisements in the Technical Press give sufficient information, nor do I propose to go into details of their respective merits. Both machines have proved very useful, but I find that there is little, if any, saving of time in cutting a pipe as compared with hand cutting with a diamond chisel. The great advantage of the machine is the certainty of a good clean cut, and a quick break when used for cutting out a main for connections. On a difficult job, when time is of first importance, this feeling of certainty is a great boon.

Testing.

The ideal method of testing mains is, of course, to cap or plug a moderate length of main and pump up to (say) 10 lbs. per sq. in. pressure with air, before the trench is filled in. The joints can then be tested with soap and water; and if the pressure is left on for 12 hours or so without any drop showing on the gauge, the main is proved to be sound.

With large mains, however, this method becomes expensive and inconvenient, as the capping-up and pumping take time, and delay the work, and it is undesirable to keep a long length of trench open. For these reasons, we have given up leaving the joints exposed. We rely only on the pressure test for mains of medium size, while for 36-in. and 42-in. mains, we have adopted the joint testing apparatus made by the Lead Wool Company. This apparatus consists of a circular frame supporting two rubber tyres, like the inner tubes of motor tyres. This frame is fixed in the main, with one tyre on each side of the joint; there being a space of 4½ in. between the tyres, and the tyres are pumped up hard. Air is then pumped into the space between the tyres, and pressure is thus applied to the inside of the joint, which is tested outside with soap and water. The apparatus is very useful, but can only be used for mains which are large enough to allow of a man working inside to fix the tyres and pump them up. This test on the joints is supplemented by testing long lengths of the main under pressure in case any defective pipes have been laid. Some risk is taken in filling in before testing for defective pipes; but if care is taken in sounding the pipes before laying, this risk is small.

Reinstatement.

The reinstatement of the road surface after a trench 4 or 5 ft. wide has been cut through the whole length of the street is a very different problem from that of repairing a small patch or even a long but narrow trench. However carefully the trench is filled in, some settlement is bound to occur; and with a wide trench the settlement may affect the surface for some width on each side. For this reason, the engineer to the road authority will usually ask for special reinstatement beyond that allowed for in his schedule rate for repairs to trenches.

Where the road surface is macadam, an extra 12 in. of hardcore is the usual requirement; if the surface has a concrete foundation, the cost of reinforcement or an extra thickness of concrete will be wanted. In some cases we have been asked to pay for the laying of 6 in. of reinforced concrete under a tarmac surface, originally laid on the old macadam or flint road. Where the trench is to be concreted, we generally leave the filling about 9 in. low, and the road authority follow up with their concreting.

As regards cost, I do not think there is much to choose between 6 in. of concrete and 12 in. of hardcore, but the latter makes the better job, as it can be rolled and the trench consolidated. Where concrete is laid on the newly-filled trench, it is almost certain to settle after a few months, if the traffic is heavy. In one borough, a small roller which can work in a

TABLE I.—*Basic Costs of Mainlaying per Yard.*

—	Diameter of Main (Inches).						
	12.	14.	18.	24.	30.	36.	42.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pipes at £8 per ton, *plus* 10 p.ct. for special castings	0 17 8	1 1 7	1 10 8	2 6 2	3 3 6	4 3 6	5 5 9
Laying	0 11 11	0 14 4	1 1 1	1 11 7	2 3 8	2 17 5	4 5 0
Reinstatement (macadam at 6s. per sq. yd.)	0 5 0	0 5 6	0 6 6	0 7 6	0 8 6	0 10 0	0 11 0
Total cost	1 14 7	2 1 5	2 18 3	4 5 3	5 15 8	7 10 11	10 1 9

TABLE II.—*Mains—Average Costs*

1.	2.	3.	4.		5.		6.		7.	
			Costs.							
Dia. of Main, Inches.	Total Length, Yards.	No. of Mains.	Pipes.		Laying.		Reinstatement.		Total.	
			Average.	Maximum and Minimum.	Average.	Maximum and Minimum.	Average.	Maximum and Minimum.	Average.	Maximum and Minimum.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
12	5,511	4	0 19 3	1 1 3 0 17 5	0 17 2	0 19 5 0 15 0	0 8 8	0 13 5 0 4 7	2 5 1	2 8 9 2 1 9
14	6,464	4	1 2 9	1 7 0 0 19 2	1 1 5	1 10 2 0 17 2	0 6 0	0 9 9 0 1 9	2 10 2	3 2 8 2 2 10
18	14,435	5	1 11 1	1 13 4 1 8 1	1 17 1	2 5 0 1 8 7	0 8 6	0 13 7 0 3 4	3 16 8	4 6 8 3 2 11
24	8,228	4	2 7 4	2 13 3 2 4 1	2 12 3	3 2 9 1 13 8	0 5 6	0 10 9 0 1 8	5 5 1	5 14 5 4 3 5
30	7,106	2	3 1 9	3 3 3 3 0 3	4 2 11	4 18 0 3 7 10	0 12 5	0 14 1 0 10 9	7 17 1	8 12 0 7 2 2
36	17,679	3	4 10 4	4 16 0 4 5 9	6 15 0	7 13 2 4 19 5	2 9 3	3 11 7 1 12 7	13 14 7	15 13 5 10 17 9
42	6,203	1	5 10 0 5 19 0	.. ..	9 14 4 10 19 0	.. ..	2 12 9 2 12 9	.. ..	17 17 1 19 10 9	(*a*) (*b*)

(*a*) Excluding railway crossings, &c. (*b*) Including railway crossings, &c.

5 ft. trench is used to consolidate the ground before concreting. This should ensure a more satisfactory reinstatement.

COST OF MAINLAYING.

The following particulars of costs of mainlaying may be found useful. In Table I., I have given what I may term "basic costs" for laying mains of from 12 in. to 42 in. diameter. These may be taken as minimum figures. The cost of the pipes, &c., is based on £8 per ton for straight pipes, and is calculated from the weights as given in the British Standard Specification, Class A, pipes. An addition of 10 p.ct. is made to allow for the extra cost of special castings. The cost of laying is estimated for a main laid in a country road, macadam surface with no obstacles, at a depth of 2 ft. 6 in. to the top of the pipe, and includes all charges other than castings and reinstatement. Reinstatement at 6s. per square yard is estimated on the bare width of the trench.

In Table II. are given average costs based on the cost of mains laid by my Company during recent years. In Col. 2 is given the total length of mains on which the average costs are calculated. Col. 3 gives the number of mains making up the length given in Col. 2. Cols. 4, 5, 6, and 7 give the costs of pipes, laying, reinstatement, and total costs respectively; the average and maximum and minimum figures being given for each group.

The figures for pipes in Col. 4 have all been corrected to a standard price per ton of £8, as the actual price per ton has varied from under £8 to over £10 during the period in which these mains were laid.

The figures for reinstatement are not of much value, owing to the variation from gravel footpath or grass verge to wood blocks on concrete, according to the locality in which the main was laid. In several cases, the cost of laying includes the installation of an underground governor at the end of the main; but on a long length of main this does not affect the cost per yard to any great degree.

A comparison of the actual costs of pipes given in Table II. with the calculated cost in Table I. will show that the average figures in Table II. are but little above, and that for most sizes the minimum figures are below, the figures in Table I. Thus, the 10 p.ct. allowance for special castings gives a good approximation to actual costs.

The average costs of laying in Table II. are in all cases higher than the costs in Table I.; the extra cost increasing steadily from 50 p.ct. in the case of a 12-in. main to 150 p.ct. for a 42-in. main. This increase is chiefly due to the greater number of obstacles which have to be dealt with as the size of main is increased. It will be noted that the minimum cost for a 24-in. main, 33s. 8d., is close to the basic cost of 31s. 7d. for this size. The main to which these costs refer was laid in the ballast footway of a new road, and a fairly clear run was experienced. For this main, the total cost, 83s. 5d., is actually below the basic total cost; the reinstatement cost being low.

As I can quote only one example of a 42-in. main, I have given figures inclusive and exclusive of the cost of crossing railways, &c. In all other cases, the cost of these crossings is included.

It is interesting to note that in 1882-83, a 48-in. main from Goswell Road to Westminster was laid at a cost of £8 7s. 6d. per yard, and a 36-in. main from Westminster to Fulham at a cost of £4 3s. 4d. per yard.

RAILWAY, RIVER, AND CANAL CROSSINGS.

One of the most expensive features of mainlaying in and about London is the crossing of railways, rivers, and canals. It is seldom that the depth of filling on a bridge is sufficient to allow of the laying of even a 12-in. main; and for any larger main, it is nearly always necessary to make some alterations to the structure of the bridge, or to carry the main outside the parapet.

There are several ways in which the structure of bridges may be altered so as to give more depth for laying a main. Where the bridge is built with girders and jack arches running parallel to the road, the jack arches may be cut away, and replaced by a reinforced concrete slab or by cast-iron plates. If the additional depth thus obtained is insufficient to take a main of the required size, two small mains or an elliptical tube may be used. On one railway in the north of London there are a number of bridges built with girders about 4 ft. deep, with cross-bracing. The footpath is carried on cast-iron corrugated plates resting on the top of the girders. We have been able to arrange for cutting away the cross-braces and carrying a main between the girders, supported on bearers resting on the bottom flanges of the girders.

There is little objection to reducing the diameter of pipe by (say) 25 p.ct. for the short length of a bridge, where it is impossible to lay one of the full size, provided the change in diameter at each end of the bridge is gradual so that pressure losses due to sudden changes of bore are avoided.

Where it is necessary to carry the main outside the bridge, it may be supported on brackets or piers. For diameters of 18 in. and upwards, steel pipes with a slight camber can be safely used in spans up to 50 ft. or more. It is advisable to provide smoke plates to protect the pipes from the corrosive action of the smoke from locomotives, and an expansion joint should be provided at one end of the span. When a long tube supported on a number of piers is necessary, the supports should consist of cradles resting on grease trays, so that movement due to expansion and contraction can occur without throwing any extra strain on the supports.

The simplest method of erecting these tubes over railways is to hire a railway crane and have the tube brought to the site on

a truck at the same time as the crane. The tube can then be lifted straight up to its position on the piers. This method can only be used, however, when complete possession of the line can be obtained for two or three hours.

When access to railway property can be obtained from a road running up to or alongside the railway, it is often cheaper to cross under the railway than to lay the main along an alternative route involving a bridge crossing. Where traffic on the railway allows, the main may be laid in an open trench lightly boarded over under the tracks; otherwise it may be necessary to drive a heading so that no work is done above ground near the tracks. For a short crossing, it is sometimes possible to excavate the trench and lay the main while the trains are stopped at night, but the time available is small. In the case of headings, the whole should be filled in with concrete, both for the protection of the pipe and to prevent subsidence. An open trench may be filled with concrete to a height sufficient to protect the pipe and the remainder up to formation level filled with hardcore. Before either a trench or heading may be opened under a railway, the railway company must lay baulk timbers under the rails to give them support.

One interesting case I may mention is that of the bridge carrying the East Ham-Barking by-pass road over the River Roding. This is a reinforced concrete bridge 700 ft. long, and a pipe bay 3 ft. deep by 6 ft. 6 in. wide is provided under each footpath. Half one bay was allotted to my Company. The problem was to find a type of joint that could be made in the space available, with a 24-in. diameter pipe. There was not room to make lead or flanged joints; and as there were ties at intervals of about 30 ft. across the top of the bay, we could not joint the whole length, and then lower into position. The "Victaulic" joint was finally selected; the casing of the joint being made in four quadrants, so that when the last quadrant was placed in position, the bolts came on the two top quarters of the pipe. Should it be necessary to remove one of these joints, the top quadrant can be unbolted and the casing turned until the next pair of bolts is on top. The second quadrant can then be removed.

The steel tubes we use for these bridge crossings or for headings under railways are made of ⅜-in. plate, with riveted joints. The circumferential joints are butted and strapped, and the longitudinal joints either lapped, or, if extra rigidity is required, butted and strapped; the joints being arranged so that the strap comes on the sides of the tubes. The tubes are delivered on the site in sections up to 35 or 40 ft. in length; the joints between the various sections of the tubes being made with flanges formed of angle-iron riveted to the ends of the tube. These flanges are bolted up on the site, either before or after erection, according to the total length of the tube.

To form the expansion joints, a spigot end is made on the tube by shrinking on and riveting a 9-in. wide band of sufficient thickness to make the external diameter up to that of British standard specification cast-iron pipes. This spigot fits into a deep cast socket with a wrought-iron gland bolt to the face; and a packing of hemp yarn and tallow, or a steam packing such as "Lion" packing, is used to make the joint gas-tight.

The price per foot run of these pipes varies according to the proportion of bends to straight pipe; the latter being, of course, the cheaper to manufacture. The following are approximate prices per foot run for various diameters, including a proportion of bends:

Diameter . . .	18 in.	24 in.	30 in.	36 in.	42 in.
Price per foot . .	£1 14s.	£2 2s.	£2 8s.	£2 16s.	£3 12s.

Tubes of elliptical section cost about 150 p.ct. more than tubes of circular section.

Discussion.

The Chairman said he was interested in the new method of testing the soundness of joints in mains of large diameter. He did not know how long it had been in use, but it must have saved a lot of money. While testing the joints, they had to rely on the contact of the rubber tyres and the internal surface of the pipe; and on the face of it he would not have thought there would be sufficient contact to withstand the pressures applied. The information which the author had given on the costs of mainlaying was exceedingly useful. He (the speaker) had noted with interest the difference there was between the actual and the "basic" costs. Looking at Table II. of the paper, he noticed that during the period under review 17,000 yards of 36-in. main had been laid. The maximum and minimum figures for the cost of reinstatement of the roads were £3 11s. 7d. and £1 12s. 7d. for the 36-in. main, while the corresponding figures for the 30-in. main were 14s. 1d. and 10s. 9d. Perhaps the author would tell them the reason for the extraordinary difference in this particular case. Mr. Lacey said how interested he had been in the photographs and diagrams which the author had thrown on to the screen relating to the methods of crossing railways and canals. To accomplish successfully work of this nature constituted no mean engineering feat. In jobs of this kind the time factor was of the highest importance.

Mr. Lacey then remarked that he had received a letter from Mr. S. B. Chandler, of the Tottenham Company, in which he expressed his regret at being unable to be present at the meeting. He had, however, sent the following contribution to the discussion:

The Association are to be congratulated in having before them Mr. Escreet's paper on a subject of so much importance to gas undertakings, particularly the larger ones. The difficulty of defining large and small pipes is, of course, to an extent governed by the size of the undertaking dealing with them. With some companies a 12-in. main is the largest on the district, but with others, particularly those of the large London and Provincial undertakings, this size is considered somewhat small. The laying of pipes of any size is becoming increasingly difficult in view of the policy of most public service undertakings of placing telephone and other ducts or cables underground; and congestion in this respect is likely to increase, particularly under footways. In addition, modern methods of road construction, especially reinforced concrete surfaces, not only add considerably to excavating and reinstatement expenses, but lengthen the time during which work can be completed. Members will be in agreement with the standard depth adopted; and this should, in my view, be strictly adhered to, especially where main roads are concerned, as heavy vehicular traffic is on the increase, and the speeds of motors tend also to go up, leading to the transmission of greater vibration to the pipe and joints. One cannot, of course, criticize in any adverse manner the methods of the Company the author represents; but the size of mains with which he has to deal, and which are no doubt common with his undertaking, are somewhat larger than those with which the smaller undertakings have to contend; and I could have wished that, though his paper defines his subject, he had given a few details and particulars of smaller diameter pipes —say, from 6-in. to 10-in.—as these are sizes which are constantly being dealt with by all engaged in distribution work. In Table I., the cost of cartage of pipes and unloading on site (important items) do not appear to have been included; and these, in my view, are items which must be regarded as forming part of the cost. With regard to reinstatement charges, where these are done by councils at the cost of the undertaking, it would appear that, in the case of some companies where a number of councils are in control within the area of supply, charges for work of a like character vary considerably. These no doubt are controlled to some extent by local and domestic conditions; but it does seem to me that efforts should be made to co-ordinate them and make them more closely approximate one to the other. I should like to express my thanks to the author for having brought this subject before the Association. I feel sure that it will, when included, add very considerably to the value of their transactions.

Cover of Pipes and Vibration.

Mr. J. Pearce, of the North Middlesex Gas Company, observed that the sizes of mains dealt with in the paper were not such as were customarily handled by the average gas undertaking. It fell to the lot of few of them to tackle mainlaying work of such magnitude; and he had been greatly impressed with the ingenuity which had been exercised in overcoming difficulties. There were two questions which he would like to ask the author. The first was in regard to the driving of steel tubes under tram tracks. Stray currents of electricity, as was well known, had a deleterious effect on steel pipes; and he wondered whether the author had experienced any trouble due to the pitting of the pipes. The other point related to the laying of pipes across bridges. In some cases the space available over the crown of the arch was very limited, with the result that there was little cover on the top of the steel tubes. After these had been laid, and concreted in, were there any bad effects due to the vibration of the heavy motor traffic of to-day? To his mind, trouble was likely to occurs.

Mr. P. Richbell, of the Croydon Gas Company, spoke about the testing of pipes under a pressure of 10 lbs. per sq. in. They had considered the matter and had arrived at the conclusion that it was better to carry out the tests at a pressure of 70 in. water gauge. Their idea was that a small leak could be more easily detected at this pressure than at the higher one, for in the latter case a good deal of air had to escape before it was shown on the gauge. With regard to the question of costs of mainlaying, they had brought into practice a scheme of a small percentage to the costs of materials and labour, to cover incidental expenses such as repairs to bags and plant, and the shaping of tools. When the author was connecting steel tubes to cast-iron pipes, did he take any special precautions as to the type of joint used? With regard to the metal expansion joint mentioned by the author, he (the speaker) presumed that this joint was suitably housed, so that it could be examined from time to time. In the matter of subways, when making connections from large mains to premises in the vicinity, were these connections taken direct from the main, or was a small branch pipe used?

Concreting Steel.

Mr. F. S. Larkin, of the Gas Light and Coke Company, said how interesting the paper was to practical men. On a works it was an easy matter to move plant, in comparison to the difficulty of laying mains quickly and having to satisfy the requirements of public authorities and other bodies. The author had referred to the placing of a cast-iron pipe on a sand bed, while steel was concreted. Was there any reason why both cast iron and steel should not be concreted?

Mr. Escreet said that they never concreted cast-iron pipes, because this rendered the pipes rigid, and any slight settlement might result in their fracture. On the other hand, the elasticity of steel enabled concreting to be done with impunity.

Mr. W. T. Kenshole, of the Lea Bridge Gas Company, asked what type of cast-iron pipe was employed for sizes from 12 in. upwards—whether the spun pipe or the ordinary cast pipe. Also, what type of joint was used for the larger pipes? Did the author use the run lead joint or the lead wool joint? Were the joints set up by pneumatic means or by hand?

The Author's Reply.

Mr. Escreet, replying to the discussion, said they commenced using the joint testing method referred to by Mr. Lacey in 1923 or 1924. A flat rubber tread, pressed against the inner surface of the pipe, gave very good contact—sufficient to support easily a pressure of from 30 to 40 lbs. per sq. in. between the tyres. For the compilation of the figures in Table II., he had taken what he considered to be representative cases; and the difference between the reinstatement costs of the 30-in. and the 36-in. mains was a question of locality. The figure of 14s. 1d. for the maximum reinstatement cost of a 30-in. main was low because the main was laid in a macadam road and the

work was comparatively simple. In the case of the 36-in. main, there was a good deal of reinforced concrete and wood paving, which made the job expensive. With regard to the speed of working on the G.W. Railway heading, they worked continuously; three shifts being employed. Mr. Chandler had referred to the importance of having adequate cover for mains nowadays, having regard to the increase in the traffic. To his (the author's) mind, this was more a question of the type of bed on which the pipes were laid. In some cases 2 ft. or 2 ft. 6 in cover was sufficient, while in some instances 1 ft. 6 in. or even 1 ft. would suffice. Mr. Chandler had also mentioned the cost of carting and unloading the pipes. In regard to this, his (the author's) figures included all these costs. As to the variations in reinstatement charges between different local authorities, these were not sufficiently great to be taken into serious consideration. Mr. Pearce had spoken about electrolysis. As a matter of fact, they had not experienced much trouble from this cause, due, perhaps, to the fact that the London County Council tramways adopted the conduit system, which, with regard to stray currents, was better than the overhead method of current transmission. In any case concrete, when dry, afforded fairly efficient insulation; and if a steel pipe was concreted in, even if a small amount of pitting did take place, the results would not be very serious. Some of the pipes across bridges had only a shallow cover, but they had had no trouble from traffic vibration. In one instance only 6 in. of cover was provided, and no difficulty had been experienced. Mr. Richbell's remarks concerning pressure tests of pipes were interesting; and it was a fact that the test at low pressure was the more sensitive. At the same time, the high-pressure test often revealed weaknesses in the pipe which could not have been ascertained by the low-pressure test. With regard to the incidental costs of mainlaying, mentioned by Mr. Richbell, nearly all the costs he (the author) had given were based on mains laid under contract. The jointing of steel and cast-iron pipes was effected by flanged socket and spigot joints or by thickening the steel spigot to make the external diameter equal to that of cast-iron pipes. Expansion joints were used only when the pipes were exposed; and consequently these joints were constantly open to inspection, owing to their accessibility. Most of the mains laid in subways were high-pressure, and only a few connections were taken off them. If, however, smaller mains were placed in subways, then the services were taken off them in the usual manner. With regard to the use of spun pipes or those cast in the ordinary way, he would say that his Company did not use the spun type. A spun pipe was made thinner than an ordinary cast pipe, and had only about the same strength. Half turned and bored joints were used as standard, and the front half was run solid with lead. They had not employed the lead wool joint, for it took longer to make, and needed greater care. Hand setting was used. Pneumatic tools were employed only for cutting out leaky joints in very large pipes.

VOTE OF THANKS.

A vote of thanks to Mr. Escreet was proposed by Mr. RICHBELL and seconded by Mr. W. H. COSH; and the author's reply terminated the meeting.

MANCHESTER AND YORKSHIRE JUNIOR GAS ASSOCIATIONS.

Visit to the National Gas Engine Company's Works, Ashton-under-Lyne, Feb. 22.

Members of both Associations were received in the General Offices by Mr. J. Orme (Director) and Mr. Wood (General Manager). The visitors were then conducted round the extensive works by Messrs. Balmford, Oakden, Wright, Wood, Green, and Browne.

DESCRIPTION OF THE WORKS.

Every factory in every district requires some form of engine, needs power drive of some sort; and the engineer who concentrates his powers upon the designing and manufacture of prime movers has thus a market in which to operate.

The National Gas Engine Company, Ashton-under-Lyne, may be taken as a remarkable example of the advantages obtained by specialization in one branch of engineering. Founded in 1889 by Mr. Henry N. Bickerton, J.P., M.I.Mech.E., well known as a leading authority on internal-combustion engines, the Company began business in a small way, with the object of supplying gas engines and suction gas plants to the works and factories in the neighbourhood. The firm soon acquired a business far greater than supply of local needs, and it grew with the years to such dimensions that the National Gas Engine Company now stands one of the largest concerns of the kind in the world.

A visitor making a tour of the works would doubtless follow the departments as numbered from 1 to 20. We think it better to exercise the freedom of the narrator, and to tell the story from the beginning, starting from the place where orders are received and given and designs are conceived, and following the process of executing the designs through the shops.

The main offices of the Wellington Works have a finely proportioned three-storey front facing the road leading from the principal entrance. Orders for suction gas plants or gas engines proceed from the head office in various directions, according to their nature. If for "repeats," the orders may be transmitted direct to the stores or the foundry, to the manager of the suction gas plant department, or elsewhere; but for the sake of clearness it may be assumed that the order is one for new work to be made according to a new design. That is to say, the start is from the drawing office. On the top floor of the building known as Bay No. 7 are housed the drawing offices, the pattern shop, and the works laboratory. Adjoining is the pattern-making shop, in which the drawings are embodied in wooden images of the parts to be cast. Though not in the direct line of the manufacturing process, the work done in the laboratory is also preparatory. In addition to testing the metals used in everyday work, the staff are constantly engaged in research.

When completed, the patterns are taken either to the pattern store, which is Bay No. 12, or to the foundry. It is the fixed policy of the National Gas Engine Company to be at the service of everyone who has purchased plant from them, no matter how distant the date may be.

Comprising Bays Nos. 9, 10, and 11, the foundry is a spacious place; two of the bays being employed in making heavy castings, and the light castings being done in the other bay. At one end of the foundry is the fettling department, fully equipped with rumblers, grinders, and emery wheels. For castings that are too large for the rumblers, a sand-blasting plant is set up, with the necessary compressors, sand filters, conveyors, &c., all electrically driven. Moulding is carried through on the floor for the large castings; the lifting of the patterns and moulds being effected by jib and overhead cranes, while moulding machines are used for forming the smaller moulds. Drying stoves, heated by gas, are provided for drying the cores, &c.

Large castings not in immediate demand are taken to the ground floor of Bay No. 7, underneath the drawing office and pattern shop, and are stored there till required. Adjoining, and forming part of the same bay, is the brass foundry, which is fully occupied with producing the castings required for engine fittings, stop cocks, and rings.

From the foundries the castings pass into various parts of the works, including Bays Nos. 16 to 19, which comprise what may be described as the "large engine shop." Hitherto all the parts of the vertical gas engines are brought to be machined, tested, and erected into complete engines. Large machine tools of the latest type are employed in shaping the castings for their functions. Here is a large horizontal double-spindle boring machine, specially adapted for boring engine beds and crank-cases, and capable of boring at the same time the bearings of the crankshaft and the camshaft. By this means a thoroughly accurate result is obtained, and much time saved. On an ordinary boring lathe only one of the operations could be performed at a time, and two settings would be necessary. For large wheels and similar work a 12-ft. boring mill has been installed, and its performance shows that tools may be both large and adjustable to minute limits. Beds of smaller sizes are bored, milled, drilled, and tapped on a horizontal boring machine with an 8-in. spindle; this machine is also used for facing cylinders. Engine beds and crank-cases are planed throughout on a planing machine 10 ft. wide by 26 ft. long; the tool being a fine example of its class. For cylinder work there are three horizontal double-spindle boring machines, specially designed, so that the main bore of the liner and also the valve-box can be bored at one setting. A very important auxiliary to the large machine shop is Bay No. 15, which contains an equipment of about 150 automatic and semi-automatic tools employed in repetition work.

Highly interesting from several points of view are the adjoining shops, numbered 13 and 14, in which engines are repaired, and spare parts for engines out of date are manufactured. A large stock of spare parts of all engines, including even the oldest types, is kept in the stores, and replacements can be supplied without trouble. Owners of the engines made by the firms who practice the scrapping policy have no security, and, when a vital part wears out, must either have it remade at great expense or buy a new engine.

An interesting example of the way in which the Wellington Works are kept up to date is found in the babbitting shop. The "Monometer" metal casting and melting machines are the most advanced appliances used for babbitting work; and in this shop a full complement of these machines is installed. Besides the melting machines, there is a magnetic separator which ensures that the white metal is perfectly free from iron or brass.

On the western side of the shops we have just noted stands Bay No. 20, a large erecting shop devoted to the construction of suction gas plants. Fully equipped with overhead and wall cranes, and fitting tools of every kind, the spacious bay contains suction gas plants of different sizes in the various stages of erection.

Following through from drawing office, pattern shop, and foundry, the manufacture of the larger engines and suction gas plants, we have left aside the departments in which are made and erected the small engines. Adjoining the main offices of the works are six large bays. Bays Nos. 1, 2, and 3 are devoted to the machining and erecting of small oil engines.

Placed along one side of each bay are milling tools, liner boring machines, bed boring machines, and other machine tools specially designed, producing work at the least possible cost in energy and time. The other three bays are used for the erection of engines of medium sizes, ranging from 50 B.H.P. up to 300 B.H.P. Bay No. 4 contains large vertical mills, by means of which flywheels are bored and turned at one setting; four tools working simultaneously. This department is furnished with two test beds for horizontal engines; each engine undergoing a brake test before passing into the paint shop for finishing.

Bay No. 8 is a spacious place, containing the paint shop and the main despatch department. Placed adjacent to the paint shop, the main despatch and engine packing department possesses adequate facilities for handling the works products and sending them on their destined ways, either by road and motor lorry or by rail; the railway siding coming into the bay.

For power, the National Gas Engine Company demonstrate their reliance upon their own speciality. At the far western end of the works is installed a Mond gas plant, consisting mainly of three large generators, each of 1000 B.H.P. capacity. Attached to the plant is fitted sulphate of ammonia recovery and tar dehydrating apparatus.

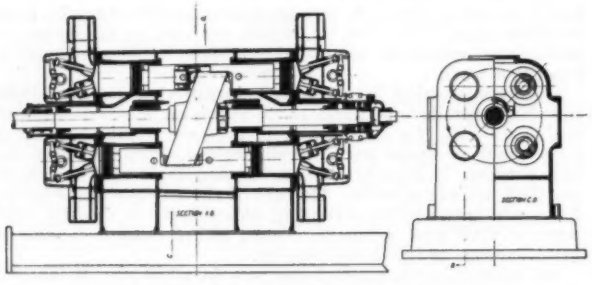
The scheme of driving adopted illustrates the advantages of the gas engine in sectionalizing power. Gas engines are installed at various convenient centres; about a dozen being employed. At the same time, the benefits to be acquired by the employment of electrical power are fully realized, as is shown by the fact that motors totalling over 2000 H.P. are installed throughout the works for the driving of machine tools, cranes, and other appliances. Furnaces, testing plants, electrical power station, and other appliances are fed with power from the Mond gas plant.

The suction gas plants can be operated on a large variety of fuels, ranging from sawmill refuse to anthracite. "National" gas engines may be divided broadly into two classes, the horizontal and the vertical engines.

THE MICHELL CRANKLESS ENGINE.

The engine exhibited was of 280 H.P. at 750 R.P.M., and it works on the four-stroke cycle, using town gas. The particular feature of this type of engine is the elimination of the crank, and the substitution in its place of a slant mounted on the main shaft, which also acts as the flywheel of the engine. The eight cylinders are arranged in pairs equally spaced round the slant, and are parallel to the shaft instead of at right angles, as in the crank engine. Each pair of pistons is coupled together by means of a yoke, and arranged so that the thrust impinges on either side of the slant by means of a Michell thrust slipper with a spherical seat. This arrangement produces a very compact engine, reducing the mechanism between the piston and the shaft to the minimum.

At first glance one would think that the high periphery speed of the slant would make the engine inefficient. It is, however, by proportioning the slippers according to Mr. Michell's patents that ideal conditions of lubrication are obtained, reducing friction to the minimum, and enabling high surface speeds to be used. The valve mechanism is simply arranged, as shown in the section drawing. The moving parts are reduced to a minimum. The engine speed is controlled by a single hand lever operating four sets of gas and air throttles.



"National-Michell" Crankless Gas Engine.

[This was shown to the visitors, who were highly interested in it.]

Afterwards those present were entertained at tea by the firm.

Mr. F. B. SMALL (Liverpool), President of the Manchester Juniors, spoke of the interest taken in these joint visits, and thanked the firm for their kindness in showing them their works.

Mr. C. H. CHESTER (Wakefield), President of the Yorkshire Juniors, said that the welcome always given to the Yorkshire Juniors by the Manchester Association was greatly appreciated. He seconded the vote of thanks to the firm.

Mr. ORME acknowledged the thanks of the two Associations.

A paper entitled "Gas-Works Effluent" was then presented by Mr. W. P. SMITH, B.Sc., of Bolton. This, with a report of the discussion, is unavoidably held over.

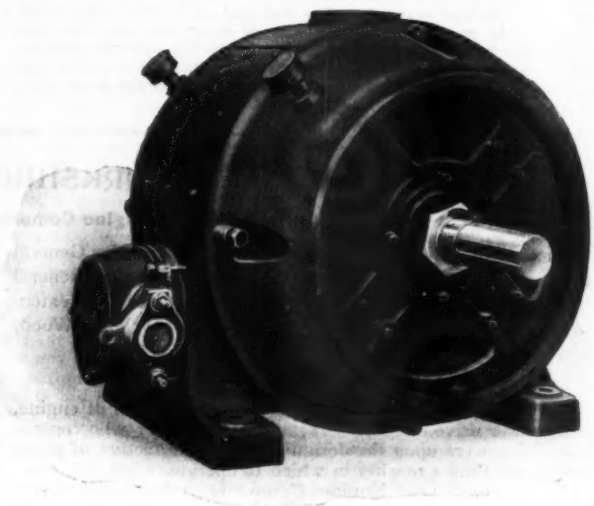
SCOTTISH JUNIOR GAS ASSOCIATION.

(WESTERN DISTRICT.)

"Emcol" Motors.

On the occasion of the visit of members to the works of Messrs. Walter McGee & Son, Ltd., on Saturday, Feb. 25, small parties were conducted round by guides, and saw every operation in the manufacture of the "Emcol" motor, which has in recent years aroused considerable interest in electrical circles.

The "Emcol" motors, being totally enclosed, are damp and dust proof. Owing to the unique mechanical cooling features, these motors are actually smaller than open motors of the same output; while the makers guarantee high electrical performance throughout the whole range of their manufactures, from fractional horse power upwards. By means of the "Emcol" features, totally enclosed motors of all sizes are placed on a practical and commercial basis.



During the inspection, members were permitted to see the latest development of the Company, which takes the form of a re-design of the cooling features. This new range of machines will show an appreciable reduction in price per horse power. In addition, the Company specialize in flame and explosion proof motors for collieries, gas-works, petrol stores, &c. A line of high-speed motors up to 7000 R.P.M., suitable for individual driving of machine tools, &c., the motor being housed as an integral part of the complete unit, was seen running on the test plate. The "Emcol" motor was also seen under working conditions; and a practical demonstration was given of the efficiency of the cooling air circuit, by passing large quantities of sawdust and ashes through without coming in contact with the interior of the motor.

After this interesting tour of the works, the visitors were entertained at tea in the canteen.

Midland Association of Gas Engineers and Managers.—The annual meeting will be held on Thursday, March 29, at the Grand Hotel, Birmingham.

"B.E.S.A." Specification for Translucent Glassware.—The Specification for Translucent Glassware Illumination Fittings for Interior Lighting (No. 324-1928), just issued by the British Engineering Standards Association, states that the expression "translucent glassware" shall be taken to include only satin-finished glass, frosted glass, sprayed enamel glass, opal glass, flashed opal glass, and glass having a milky texture, and not any form of decorative glassware. After specifying the general conditions of the glassware and requiring the type, maximum rating, and position of the light source to be clearly stated by the manufacturer, there is given a table of the neck dimensions of totally-enclosed and bowl fittings and metal work for both electric and gas lighting. In order to safeguard against the likelihood of cracking or deterioration due to overheating, a heat-resistance test has been included; and it is also required that in the case of electric light fittings the fitting shall be so designed that the internal leads do not become heated to such an extent as to cause any dangerous effects. The diffusing power, brightness, and performance of the fitting are also dealt with; and a testing clause covers the selection and testing. Two appendixes give respectively methods of flux and brightness measurement. Copies of the Specification (No. 324-1928) may be obtained from the Publications Department, British Engineering Standards Association, 28, Victoria Street, S.W.1, price 2s. 2d. post free.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Coke-Oven Gas Supply to Small Undertakings.

SIR,—In reply to my remarks in the discussion on "The General Scope of the Coke Oven Industry," by Messrs. Finn and Ray, at the Carbonization Conference, Mr. Ray, referring to continuity of gas supply from coke ovens, said that it would not be profitable business for the coke ovens to keep going for the supply of relatively small quantities of gas.

Apparently Mr. Ray, along with other coke oven managers, fails to realize that, out of approximately 1100 gas undertakings in England and Wales, there are only 290 supplying more than 100 million c.ft. of gas per annum. This means that the maximum requirements of gas of more than 800 undertakings is not ½ million c.ft. per day; and in the majority of cases it will be nearer ¼ million c.ft. per day. If, therefore, the coke oven industry are desirous of increasing their business with gas undertakings, they must be prepared to keep their ovens going continuously, no matter how small the quantity of gas required.

The gas industry have had to cater for a continuous demand since the beginning of their existence; and if the coke oven industry will see that their plants are so constructed that they can give a continuous supply, there should be no difficulty in their increasing their business.

JNO. W. BREARLEY.

Gas Offices, Swinton,
Near Rotherham,
March 1, 1928.

Pulverized Fuel from Low-Temperature Coke.

SIR,—The paper presented by Mr. F. S. Sinnatt, of H.M. Fuel Research Board, to the Carbonization Conference, held in Birmingham from Feb. 21 to 24, is more than usually interesting and worthy of deep study.

Incidentally, Mr. Sinnatt touched on the question of the pulverization of low-temperature coke for fuel purposes; and as this matter has been very much before the public recently, perhaps the writer, who has had practical experience of the subject, may be permitted to give his views based on the observation of the working of a particular type of pulverizing plant.

The Lancashire boiler under trial was connected up with a very efficient pulverizing outfit; the coal used being an inferior slack containing a large percentage of dust. The calorific value was 11,493 B.Th.U. and the ash content 17·14 p.ct. Using pulverized coal, the gasification temperature was 1400° C. and the calculated boiler efficiency 76·2 p.ct. When a change-over was made to pulverized low-temperature coke, the efficiency fell off.

The coke contained from 5 to 7 p.ct. of volatile matter; and we came to the conclusion that if the coke contained less than 5 p.ct. of volatile, it would not prove an efficient form of fuel.

A temperature of about 1400° C. was sufficient to gasify the powdered coal, but we had to raise the temperature to at least 1500° to 1550° C. to gasify the powdered low-temperature coke, which temperature was hard on the refractories employed.

In comparison with the coal, the pulverization of the coke to a sufficiently fine grade was extremely difficult, and the grinding parts of the pulverizer suffered in consequence. In my opinion, a pulverizer of the toothed description will enjoy only a short life when dealing with coke, as the attrition is very severe. A type of ball mill on the Harding grading steel ball principle appears to be the most suitable pulverizer to deal with coke.

It has been publicly stated in certain quarters that one of the merits due to the pulverization of low-temperature coke is that it does not clinker during the process. This is difficult to understand, as the ash in the coke under trial became reduced to red hot molten slag—very nasty stuff to deal with. Furthermore, it is well known that the ash percentage in coke is higher than that in the coal from which it is produced.

The plant in question differed fundamentally from the general run, inasmuch as the powdered fuel is first gasified to CO in a pre-gasifier situated outside the boiler furnace into which the CO gas is blown, while a secondary hot air supply introduced into the boiler furnace itself completes the combustion to CO_2. It is, in fact, a two-stage process.

The analysis of the flue gases showed 13·72 p.ct. of CO_2, 5·35 p.ct. of O_2, and no CO at all. Furthermore, no dust of consequence was carried forward through the boiler flues, which may be considered very satisfactory.

As the pre-gasifiers, one to each boiler tube, are easily removable for repairs or relining, they can as easily be replaced without interfering with the boilers at all. In fact, with a pre-gasifier in reserve, a quick change may be made without seriously hindering steam raising; and the gasifier may be easily connected up with any type of boiler without altering or tinkering about with the existing boiler furnace.

Naturally the boiler furnace space must be lined with a suitable refractory; and the choice of a refractory is a matter of great experience. A really first-class refractory is an expensive item.

We have recently read a great deal about the use of pulverized low-temperature coke for steamship boilers, and the ease with which it may be pumped into bunkers, &c.; but these enthusiasts must bear in mind that both powdered coal and coke are very hygroscopic, and absorb damp very readily. Unless they are kept practically bone dry, or at any rate do not contain more than 4 p.ct. of moisture, the projection of the powders through the conduits leading to the pre-gasifiers presents considerable difficulties, while the heat developed from the fuel is seriously impaired. Damp powdered coke is worse to deal with than damp powdered coal.

Transport in open trucks, and any exposure to humid sea air, are matters to be taken into account, especially as re-drying the powders is a troublesome and expensive operation.

I speak from experience. Later I may perhaps be permitted to return to this subject, and especially to the fineness and homogenity of the pulverized coke.

F. D. MARSHALL.

19, *Queen Anne's Chambers, S.W. 1,*
March 3, 1928.

REGISTER OF PATENTS.

Lubricating Gas Meters.—No. 283,357.

SMITH, E. W., FENLON, G. T., and SMITH METERS, LTD., all of Kennington Park Road, S.E. 11.

No. 4116; Feb. 14, 1927. No. 30,498; Nov. 14, 1927.

This invention relates to the internal lubrication of dry meters, and in particular of the gas valves, which in a general way have a reciprocating action. According to the invention, s scoop-like device is driven from the meter mechanism and is adapted to dip into an oil sump, pick up a small quantity of oil, and discharge it to means by which it is conveyed to the parts to be lubricated.

There may be provided a revolving shaft or a wheel boss suitably geared to one of the usual rotary shafts of the meter with a scoop extending radially from it and so arranged that when the shaft or the boss is rotated it picks the lubricant from the sump and delivers it to distributing means. The latter may consist of a hopper so positioned that the scoop pours lubricant into the hopper which delivers the lubricant to (say) the valves in the meter attic by way of suitable means such as one or more channels containing a wick with its ends arranged to brush against the valves as they reciprocate.

Alternatively, the scoop may be mounted on an arm of channel or hollow form communicating with the hopper or communicating with a hollow boss of the wheel which directs the lubricant to a distributing device after it has passed down the arm from the scoop.

Coin-Freed Mechanism.—No. 283,637.

BINGHAM, J. H., of Harrow, and GLOVER, G., & CO., LTD., of Chelsea, S.W. 3.

No. 25,495; Oct. 13, 1926.

This patent is for coin-freed mechanism of the kind in which a coin inserted into a coin pocket engages teeth on a wheel mounted on a vertical spindle, and acts as a driving connection; a door being provided to close the edge of the pocket opposite to the toothed wheel. The hand-operated spindle is geared directly to the rotary spindle carrying the coin pocket; and a stop is held in various positions of adjustment by engagement with a toothed plate secured to a fixed frame part.

Coins of different sizes, inserted into the coin pocket through a single coin slot in the casing of the mechanism, are respectively held in position in the coin pocket to engage the teeth of a selected wheel of a series of wheels arranged co-axially upon the vertical spindle and forming parts of different trains of gearing.

A feature of the design is that the edge of the pocket opposite to the wheels is made of a contour such that its distance from each wheel in the plane of the latter is made different for each wheel so as to support coins of different sizes in engagement with the appropriate wheels respectively.

The coin is introduced into the coin pocket through an axial slot in the hand-operated spindle, which thus serves as a guard plate to prevent the insertion of coins into the pocket when the latter is moved away from beneath the spindle.

Coin-Freed Meters.—No. 283,648.

HOYLE, D. G., and GLOVER, T., & CO., LTD., both of Edmonton, N. 18.

No. 25,724; Oct. 15, 1926.

This invention relates to that class of inlet valve mechanism operated by the coin-freed mechanism which can be readily removed and replaced without disturbing the setting of the meter mechanism.

The invention comprises a valve box, a stuffing box permanently connected therewith, a spindle in the stuffing box passing into the valve box and engaging a bearing therein, an arm secured to the spindle within the valve box, means on the spindle outside the stuffing box containing the coin-freed mechanism, a hole in the valve box surrounded by a ring wall having a seating at its base, a disc carrying a spring-controlled pivoted rod having the valve attached thereto, a disc having holes on opposite sides of the pivot of the rod for inspection of the valve, the disc being positioned in the ring wall

and on the seating therein with the valve in position to be acted upon by the arm to close the end of an inlet tube and be returned by the spring, closure means to the ring wall, and an outlet from the valve box to the bellows chamber.

The specification describes the design with reference to drawings, and it is seen that the valve is removable from the valve box, the stuffing box remaining a fixture; and all the mechanism is comprised within the valve box, which can readily be secured in the meter.

Furnaces for Annealing.—No. 283,767.

British Furnaces, Ltd., of Chesterfield, and Smith, E. W., of Victoria Street, S.W. 1 (a communication from the Surface Combustion Co., New York).

No. 7942; March, 22, 1927.

This invention relates to that kind of annealing furnace in which the burning gases enter the heating chamber at one of the longitudinal sides thereof, and flow round the muffle to leave the chamber beneath the latter.

It is essential that the muffle should be heated uniformly; but an obstacle is that the burning gases, having become cooler, have contracted in volume by the time they arrive at the side of the heating chamber, far from the side at which they enter.

This invention relates to means of minimizing the effect of this contraction in volume and for permitting a uniform heating of the muffle. It consists in a construction whereby the entering gases are burnt in a combustible chamber formed by a partition in known manner along the side of the heating chamber, and a portion of the products of combustion is caused to return from the heating chamber to the combustion chamber at the lower part thereof. In this manner the flow of gases round the muffle is increased.

Deflector for Incandescent Burners.—No. 284,051.

Raybould, A., and Lewis, G. M., both of Birmingham.

No. 29,891; Nov. 26, 1926.

The object of this invention is to provide a products deflector which does not necessitate any alteration of the burner itself, is of attractive appearance, is easily cleaned, and is resiliently mounted on the lower end of the gas feed pipe above the burner in such a manner that it is securely held without danger of cracking and can be rotated for cleaning purposes.

According to the invention the deflector is formed by a disc of glass, porcelain, or other easily cleaned material, which may be plane or dished, and the disc has a central aperture by means of which it is rotatably mounted between resilient washers on a reduced neck on a detachable lower end part of the gas pipe leading to the gas nipple in an inverted gas burner.

LEGAL INTELLIGENCE.

COURT OF CRIMINAL APPEAL.

(*Before the* Lord Chief Justice (Lord Hewart), *Mr.* Justice Avory, *and Mr.* Justice Roche.)

Eaton's Application to Appeal Dismissed.

Col. Edmund Octavius Eaton, whom the Common Serjeant at the Central Criminal Court described as "having carried on the profession of a public plunderer" and as being "a most serious danger to the community," appealed, without success, to the Court of Criminal Appeal against his conviction for publishing fraudulent statements in a prospectus of the Chalk Fuel, Power, Gas, and Bye-Products Corporation, Ltd., of which he was one of the Directors. He was also convicted of false pretences; and the sentence passed on him was one of four years' penal servitude.

Mr. Valetta, who represented Col. Eaton, stated that the appeal was based mainly on the ground that the Common Serjeant failed, in his summing-up, adequately to put before the Jury the true effect of the evidence of Mr. G. Franklin, a marine engineer, who reported on the tests made with chalk fuel some years ago. The first question was whether Eaton was aware of the contents of those reports; and the second was whether they were published in a garbled manner for the information of, and for the purpose of deceiving, the public.

Mr. Justice Avory: If you are going to contend that the reports were published by Eaton exactly as they were written by Mr. Franklin, you forget Mr. Franklin's evidence on the matter.

Mr. Justice Roche: He alleges that it was 25 p.ct. worse than the worst coal; and the published report stated that it was half again as good as coal.

Mr. Valetta also complained that, contrary to accepted practice, Eaton had been subjected to cross-examination with regard to "his ghastly association with numerous companies, most of which it was alleged had never paid a dividend."

The Court dismissed the appeal.

Mr. Justice Avory, who delivered judgment, related how Mr. Franklin was employed to test and report on the use of chalk fuel as a substitute for coal for the purposes of steam raising, gas, &c. His report was that it was unsatisfactory. He tried the fuel in a locomotive, but not the class of locomotive that appeared on the prospectus that was subsequently issued. It was tried in a small engine on a light railway near Chichester; and it appeared that the engine would not run more than a few hundred yards at a time, and then it stopped. It took from four to five hours to travel 5 or 6 miles. [Laughter.] A Mr. Mackie also made a report on what was known as the calorific value of the fuel; and that, too, was not a report in favour of the product. The prospectus, however, contained figures with regard to the fuel that were calculated to deceive; and the Jury could not help coming to the conclusion that Eaton must have been apprised of the contents of the original reports. If he was so apprised, then he was undoubtedly a party to the publication of the false statements in the offending prospectus.

MISCELLANEOUS NEWS.

WANDSWORTH, WIMBLEDON, AND EPSOM GAS COMPANY.

ORDINARY GENERAL MEETING.

The Ordinary General Meeting of the Company was held on Tuesday, Feb. 28, at the Cannon Street Hotel, E.C.—Mr. Frank H. Jones, M.Inst.C.E. (the Chairman), presiding.

The Secretary (Mr. C. W. Braine, F.C.I.S.) read the notice convening the meeting; and the report of the Directors and the statement of accounts for the year ended Dec. 31 were taken as read.

The Chairman, on rising to move their adoption, said: Ladies and gentlemen,—The past year has been one of progress for the Company. As you will see from the report of the Directors, we have sold during the year more gas to the extent of 2·2 p.ct., being the largest amount ever sold in the Company's history. We have added 3500 to the number of our consumers, and that brings the total number to nearly 90,000. Looking through the various returns which I get, I find that, comparing 1927 with 1926, they were such abnormal years that there is very little value to be attached to the comparison. The coal strike came in 1926, and the result of that strike was felt during part of 1927.

An Interesting Comparison.

Therefore, I got out the figures of comparison between 1927 and 1922; and I find that the Company increased their sale of gas in those five years by 25 p.ct. The capital ratio of expenditure to business done is rather lower—that is, rather better in 1927 than in 1922. But what I think is one of the best signs of all is that the consumption of gas for every one of our consumers has increased each year since 1922, so that we have not only added to the number of our consumers, but the average consumption was 10 p.ct. more in 1927 than in 1922. We have therefore done two things: We have added new consumers, and by a good supply of gas and efficient service we have induced our consumers to use more gas per head. That is an economical way of getting new business, because you have the same meter, the same service, and the same account when it is sent out. During the year we have laid 17½ miles of new and additional mains. That is a very large amount for us, and it includes a main we have always felt was wanted—a main connecting the Wandsworth Works on the Thames with our Mitcham Works. This main is being used to-day as a low-pressure main; but it can in future be employed as a high-pressure main, so that we can manufacture gas at Wandsworth, where the coal arrives, and pump it through to Mitcham—and, we hope, later on to Epsom.

Big Outputs.

During last December, when there was very cold, rough weather, your works and staff were subjected to a severe test, because on Dec. 19, 20, and 21 the Company sent out more gas than they have ever done on any single day before. On the 20th we sent out over 15 p.ct. more than we had ever sent out. But the districts were kind to us, because Epsom took most on the 19th, Wandsworth on the 20th, and Mitcham on the 21st, so that they did not make this exceptional demand upon us at the same time. This extra gas was supplied without undue trouble at the works, and I think I can say without any inconvenience to our consumers.

An Agreement with the South Metropolitan Company.

There is a paragraph in the report about a portion of the Company's district being transferred to the South Metropolitan Gas Company. There was a small isolated area in the old Mitcham Company's district called "Lonesome," consisting of a factory and one or two houses. The other Company had mains nearby, while the Mitcham Gas Company's mains were a long way off. Those two Companies entered into an agreement that the South Metropolitan Gas Company should supply that small area; and that arrangement went on for years. Just before the war, the Wandsworth Company thought of taking it over; but the war came, and the matter was held up. A year or two ago, however, the Companies came to an agreement that whichever Company went to Parliament first that Company would include, as one of the things they would ask Parliament to sanction, the legalizing of that small area, which is only a street-and-a-half and the factory, being transferred to the South Metropolitan Company, who had always supplied it. The South Metropolitan Company have a Bill in Parliament this year in which this proposal is incorporated; and it is really only carrying out the agreement entered into in 1895. I am sure you will agree that your Directors have done right. We did not particularly want it; and that Company are only keeping the small area which they have always supplied, and which formerly

the Mitcham, and now the Wandsworth, Company never have supplied. Of course, it is all subject to the sanction of Parliament, because neither the South Metropolitan nor the Wandsworth Company, nor any other company, can alter their boundaries without the sanction of Parliament. That will probably be given during the summer.

Coal Handling Arrangements.

Your Directors and every one connected with the Company are particularly proud of our ships and of our coal unloading arrangements; and I think I am not putting it too high when I say that our ships are certainly as good as any on the Thames, and that our coal unloading arrangements are also very good. During 1927 we made one or two records which I think may interest you. Our newest ship, the "Ewell," carried nearly 100,000 tons of coal right up to the Wandsworth Works in 52 trips. The old original "Wandle" made 72 trips; but she, of course, was a much smaller ship and so never carried the same quantity. Then there are other things about our ships of which we are rather proud. One is that during last year we unloaded two ships at the same time at the Wandsworth Works—a thing we have never done before. Another incident of which Mr. Croft and his seafaring department are proud is that during one period of seven days we unloaded six ships, which is also a record. I am giving you these figures because they are so interesting to us that they must interest you. They are matters which at one time we did not think we should be able to do.

New Plant to be Installed.

At the Wandsworth Works we are putting up some plant of a type quite new in this country. I will not say more about it than that we have gone into the question of this method of making gas very carefully, and we have every hope that it is going to be efficient and economical. That deals with the works and the ships.

As far as the district work, as we call it, is concerned—that is, the supplying of the gas outside the works—I think we have never been so busy as last year and as, in fact, we are now. Our showrooms have been brought up to date. We have spent a considerable sum of money on them and on our outside business, which is the business, first, of giving a full, level, and proper supply of gas to our consumers, and, secondly, of trying to add to the number of our consumers. We are not doing this, of course, as fast as we should like, but as fast as is convenient to the Company.

Wandsworth's Low Price Record.

We last year reduced the price of gas—which had gone up owing to the coal stoppage—by 2d. per therm in each of our districts; and I am pleased to be able to tell you that your Directors have agreed to a further reduction in price of 0·4d. per therm in all our areas, dating from the meter reading in March of this year—that is, the quarter which we are now in. The gas is being charged in the Wandsworth area at 8d. per therm, but after that it will be 7·6d. per therm. We are pleased to be able to tell you that, because Wandsworth gas has been the cheapest gas in London as long as I can remember. ["Hear, hear."] It is now 8d. per therm; and with the exception of the Company at Hornsey, who, I believe, charge the same price, it is the cheapest in London. We have gone into the matter, and feel that this is the proper price to charge; and we hope, and think, it will earn its dividend, and that we shall have the advantage we anticipate of selling more gas because it is cheaper.

Proposed Debenture Stock Issue.

You have had a letter with regard to an issue of £200,000 of 5 p.ct. debenture stock which the Company proposes making. Of course, this is issued under the powers which you have given to the Directors to raise certain money which is authorized by Parliament. Anybody who cares to apply to the Company can get a copy of the prospectus. Now I want to tell you why we require the money. We owe the bank at different periods varying sums of money; and when the balance-sheet was struck, on Dec. 31, the amount was £80,000. We want also to invest some money, because we have a reserve fund, a special purposes fund, and a pensions fund; and we think—and I hope you will agree—that those funds should be kept, as nearly as possible, fully invested, and largely in outside securities. I know that is not the belief of all gas companies; but it is the belief of the Directors of the Wandsworth Gas Company. These special funds are liabilities on the Company, or will be some day; and they ought to be invested as fully as possible.

I do not propose going through the balance-sheet and telling you what something cost this year and what it cost last year, and what we have saved or lost, because it is not necessary to do so; but if the shareholders wish to ask any questions, I shall be only too glad, with the assistance of the officers, to answer them. There are, however, just two points. For some years past there was a figure in our balance-sheets of about £11,000 under the heading of "Rehousing." That was freehold property bought for the Company, and it had never been put into the capital account. Personally I think it ought to have been; and we have done it now.

The Co-Partners' Bonus.

There is one other figure, and this, I think, you will probably consider the most interesting. If you look at the balance-sheet, you will see under "Profit-sharing" a figure of £19,720. That is the bonus, which works out at about 13 p.ct. on the wages and salaries of our staff and workmen; and it is the bonus which, by the price of gas, was earned during the year 1927. Now that bonus is not distributed in cash; it is distributed as certificates of the Company's stock which has been purchased in the open market; and our 1340 co-partners have certificates of varying amounts, according to their status in the Company. I am often asked whether the results of the Company would be as good or worse if we did not have something of this sort. I can only tell you very definitely, from my own knowledge and belief, that if we had not in the past made provision for a pensions fund, for sickness, and for profit-sharing, this Company would not be in the position it is in to-day. I am convinced we should not be selling gas as cheaply as we are doing; and I am sure we should not have been able to make this reduction.

Mutual Confidence Essential.

You may ask how it is done. Well, one sees a good deal in the papers about mutual confidence. What is this wonderful mutual confidence? I think it is both sides trying to look at the other man's point of view as well as his own. Well, we, as Directors of the Wandsworth Company, not only do not employ anybody that we have not confidence in, but we, both as your Board and individually as Directors, make it our business that everybody should have confidence in us. Unless this confidence is mutual, you do not get very far. That is one of the great troubles. This confidence, I am convinced, must begin in the Board room of the Company. Get everybody under you to have confidence in you, and in time you will be able to have confidence in them. I am sure you will all agree that this £19,720 given to our staff and workmen represents a wise and proper system which this Company have carried on for a good many years now. I will not call it a good investment; but it is a fair and proper division of part of the earnings of the Company. ["Hear, hear."]

Sound Position of the Gas Industry.

I have a letter from a shareholder who, sending his proxy, says he would like to have my views upon the question of whether the pushing of electricity, as it has been by recent legislation, may be doing damage to the gas industry. I would answer that in this way: I personally have looked through—and when I say "looked through," I do not mean that I have glanced at them casually, but have analyzed them carefully—the balance-sheets of twenty English gas companies (including the biggest in this country), and with one exception they had all sold in 1927 more gas than they had ever sold in their history before. That does not look as though gas were a dying industry; but we in this Company are fully alive to the fact that we have great competitors. People do not seem to realize who are the real competitors of gas. It is not electricity, but the Anglo-American Oil Company and the coalfields. What we want to do is to get more people to use gas instead of coal or oil. Electricity we can compete with; we have done so hitherto. I am not running down electricity, for I realize that there is room for both; but if only the gas industry will go on as it has done in the past, and be as well managed, and have as far-sighted and clear-headed people in it as hitherto, I have no doubt at all as to its future.

The Thames Floods.

There is another matter to which I feel that I ought to refer. You will remember that earlier this year the River Thames overflowed its banks, and did a tremendous amount of harm. Much damage was caused to humble houses in our area of supply: and your Board subscribed 100 guineas to the Lord Mayor's relief fund—asking, however, that it should be spent in the Wandsworth area, as it was. I am sure you will approve of that subscription; and I may tell you that our own workmen collected themselves nearly as much as we gave—I think the amount was about £72. That was a very fine effort on their part. ["Hear, hear."]

Our works were flooded, but not very much damage was done. The London County Council sent fire-engines, and pumped out our cellars and works, and in due season sent in a bill of £80. We made no protest or representation; but we have since received a letter from the Council, telling us to tear-up the account, and that they would pay for the work themselves. [Applause.]

The Audit.

I may say that our Company have two Auditors, and our Act of Parliament stipulates that one of them must be a qualified accountant. We have one who is a qualified accountant, and one who is not. Though, of course, it is the shareholders' business, I personally would like you to see that we have in the future two properly qualified accountants. It gives a very great feeling of security to know that your accounts are being thoroughly looked into and kept in proper order. These accounts have been well audited in the past; and we are not grumbling about anything. But the Accountant Auditor does do much more than the lay Auditor can do; and after he has paid his staff for the work they do, there is at the present rate of remuneration nothing left for him. I am therefore going to ask you to increase the fees from £200 to £300 on the understanding that the additional £100 goes to the qualified accountant; and then if in the future you do elect a second qualified accountant, the same thing can be done in his case.

We have lost—though not by death, I am glad to say—the late Manager of the Epsom Works, Mr. D. R. Smith, who has retired on pension, after 45 years' service. We have consequently had a rearrangement of our staff. In conclusion, I may say that our working results are very good. It is not necessary to go into figures. I now beg formally to move that the report and accounts be adopted.

The Deputy Chairman (Mr. R. Garraway Rice) seconded the resolution, which was carried unanimously without discussion.

The Dividend.

On the proposition of the Chairman, seconded by Dr. T. A. Ives Howell, it was agreed that dividends be paid for the half-year ended Dec. 31 last at the rates per annum of 5 p.ct. on the preference stock, 8½ p.ct. on the Wandsworth "A" stock, 7 p.ct. on the Wandsworth "B" stock, £5 19s. p.ct. on the Wandsworth "C" stock, £6 12s. 6d. p.ct. on the Wimbledon stock, £7 2s. 6d. on the Epsom stock, and £5 19s. p.ct. on the new ordinary stock.

Re-Elections.

Dr. Howell proposed the re-election as a Director of Mr. Frank H. Jones. Mr. Jones, he said, had now been Chairman of the Company for some three years; and it was only fair to say that he had

won the regard, affection, and confidence of his colleagues by the way in which he had carried out the duties of his office.

Mr. G. F. Page seconded the resolution, which was agreed to.

The Chairman then moved the re-election of the other two retiring Directors—Messrs. R. Garraway Rice and J. Bromley Howell—and this was seconded by Mr. R. M. Chart, and agreed to.

Mr. J. C. Potter proposed the re-appointment of the retiring Auditor, Mr. E. L. Burton; the fee to be increased, as had been suggested by the Chairman, by £100, which additional amount should go to the professional Auditor.

Mr. Sherrard seconded this; and it was carried.

Votes of Thanks.

The Chairman proposed a vote of thanks to the officers, staff, and workpeople of the Company. It was, he remarked, invidious to mention names; but he could not help referring specially to Mr. Charles Braine and Mr. Cyril Croft. They spared no efforts in forwarding the interests of the Company; and what they would do, everyone else would do. He thanked everybody in the Company's service for their great loyalty, their very hard work, and the invaluable help they gave him as Chairman of the Company.

Mr. B. R. Green seconded the vote with great pleasure—not alone on account of the excellence of the results, which enable the Wandsworth Company to sell gas at the lowest price in the neighbourhood of London, but because he knew from his own experience how greatly this vote at the annual shareholders' meeting was appreciated by all engaged in the undertaking.

The vote having been carried by acclamation,

The Secretary remarked that this was, he thought, the 33rd year that he had stood at the right hand of the Chairman of the Company to return thanks for this vote. It certainly was a vote which all appreciated. The Chairman had spoken about confidence. All who knew him regarded him, as his fellow Directors did, with confidence and affection, and were only too pleased to do everything they could in the interests of the Company.

Mr. C. M. Croft (the Chief Engineer), speaking for the officers and employees on the works, said the Chairman had pointed out that the working results of the past year had been good; but they had every hope in the future of doing even better, in view of the new plant that was being put down. The spirit of co-operation by which all were animated at Wandsworth had much to do with their success.

Mr. A. S. Legg moved, Mr. O. B. Green seconded, and the shareholders cordially passed, a vote of thanks to the Chairman and Directors.

BARNET DISTRICT GAS AND WATER COMPANY.

The Annual Ordinary General Meeting of the Company was held on Monday, Feb. 27, at the Cannon Street Hotel, E.C.—Mr. William Cash, F.C.A., J.P. (the Chairman), presiding.

The Secretary (Mr. E. D. Davey, A.C.A.) read the notice convening the meeting; and the report of the Directors and the statement of accounts for the year ended Dec. 31 were taken as read.

The Chairman, in moving their adoption, said the accounts might certainly be regarded as satisfactory—indicating, as they did, the continued growth of the undertaking. During 1927 they had connected 589 new gas consumers and 1144 water consumers. The water rental had increased some 6 p.ct.; but the actual quantity of water supplied—1927 having been a wet summer—was not proportionately greater. Gas sales were about 3½ p.ct. up. Some 2½ miles of gas mains and 4⅝ miles of water mains had been laid. So far as the gas undertaking was concerned, the net cost of coal and oil, less residuals, was less than in 1926. During the twelve months the Hatfield Water-Works were taken over. Duplicate pumping plant had been installed there, and steps had been taken to deal with the sterilization of the water. From the renewal fund statement, it would be seen that further expenditure had been incurred upon the Roestock Station, which they had always regarded as replacing some of their older stations, and so had charged the outlay to that fund. Very shortly it would be necessary to consider the question of extending the storage capacity.

For more than one reason it was difficult to compare the figures of 1927 with those of 1926, which, for reasons which would be remembered, was an abnormal year. Also, following the instructions included in the Company's 1926 Act, the allocation of the management expenses was now made on the basis of the relative capital; and there was some difference here, as between the gas and water undertakings. Further, the water revenue account was affected by the acquisition on April 1 last of the Hatfield undertaking.

Reductions in the Price of Gas.

The Directors had endeavoured to do what they could for the gas consumers by steadily reducing the charges. They began the year with gas as high as 12·5d. per therm—a figure necessitated by the cost of purchasing foreign coal on account of the stoppage. On April 1, the price was reduced to 11·5d. per therm; on Oct. 1, to 11d.; and notice had now been given that as from April 1 next there would be a further reduction to 10·5d. It might seem that they had been a long time getting back to the pre-stoppage price; but 10·5d. was a very low figure, and they could not return to it now but for the fact that they had entered into favourable coal contracts which extended some little way ahead. Of course, they were up against keen electrical competition; but when the cost of gas and electricity was compared, there was one little matter which the consumer of the latter was apt to overlook—namely, the cost of frequent renewals of lamps, which must be added to the price charged for current for lighting purposes.

As to the final results which were brought together in the profit and loss account, he would draw attention to the fact that, before arriving at these figures, the Directors had transferred to the gas renewal fund £2060, and to the water renewal fund £4330. Further, they had written-off a proportion of the costs of the 1926 Act, £3034; and the duty on the new capital, £2076. This explained why they were drawing on the carry forward to the extent of £786. He felt sure the proprietors would regard the results as entirely satisfactory, having regard to the sums set aside and to the exceptional writings-off.

Agreement with the Metropolitan Water Board.

The proprietors were told a year ago that Parliament, in its wisdom, had refused to authorize the sinking of proposed wells. They had now entered into an agreement with the Metropolitan Water Board, under which the Board bound themselves to give the Company in perpetuity, on an equal basis with London—and this was a matter of importance—a supply up to 6 million gallons a day. The Directors regarded this agreement as extremely valuable. It was on top of any additional water they might be able to get from their existing stations, and would meet the demands of this area for a long time ahead. He thought the Company were to be congratulated upon the fact that they had secured in this way from persons who were perfectly capable of fulfilling any obligation into which they might enter an adequate supply of the nature he had indicated. There did seem to him to be sometimes a slight tendency to forget that statutory companies were entrusted with the duty of supplying water under statutory obligations; and he would rather deprecate attempts by local authorities to introduce into Bills clauses or safeguards which might unduly hamper activities or in any way prove oppressive to those who were performing such duties as Parliament might have entrusted them with. So far as gas legislation was concerned, steps were being taken to obtain from the Government—and he hoped ultimately from Parliament—greater freedom for the undertakings. In this endeavour he understood the Government were not unsympathetic, though it was extremely difficult to get any substantial legislation through Parliament in the present state of public business. Under the agreement with the Metropolitan Water Board, the Company undertook to develop their existing stations so far as possible—and particularly they were to link-up their Tyttenhanger and Roestock Stations and develop their new station at Hatfield. To give effect to these proposals, the Company were promoting a Bill in the present session of Parliament; and, subject to limitations as to quantities, the Hertfordshire County Council were in agreement with them. At present there was no opposition at all in the First House, which was a matter for congratulation. The Directors were including in the Bill provisions for paying pensions, on a contributory basis, to their workpeople. He was sure the proprietors would agree that it was their duty to take care of their employees. Personally, he would have liked to see established a co-partnership scheme which would have had coupled with it a basic price of gas. This, however, was a somewhat difficult matter to arrange in the case of a combined gas and water company, though there was a great deal to be said in favour of a minimum return for shareholders. Unfortunately, the Hertfordshire County Council objected to the principle of a basic price; and the Directors came to the conclusion that, on their part, they were not prepared to enter into a co-partnership scheme for a maximum dividend company. They had consulted their men, who seemed, on the whole, inclined to prefer a pension scheme to co-partnership—seeing that the Board did not think it advisable to ask the proprietors to sanction both. In conclusion, he expressed the view that the Company might look forward to 1928 being another successful year.

The Deputy Chairman (Dr. J. W. L. Glaisher, F.R.S.) seconded the motion; and there being no questions asked or comments made, it was put to the meeting and carried unanimously.

The Dividend.

On the proposition of the Chairman, seconded by Mr. William Richards, a dividend was declared, for the half-year ended Dec. 31, on the ordinary stock at the rate of 7 p.ct. per annum, less income-tax, leaving to be carried forward a sum of £22,672. The Chairman pointed out that this was the maximum dividend.

The retiring Directors were re-elected—Dr. J. W. L. Glaisher, on the proposition of the Chairman, seconded by Mr. Colin Docwra; and Mr. William Richards, on the motion of the Chairman, seconded by Mr. Samuel Cutler, Assoc.M.Inst.C.E.

The retiring Auditor (Mr. B. Dennett Holroyd, F.C.A.) was also re-appointed, on the proposition of Mr. F. R. Smith, seconded by Mr. Plummer.

The Chairman proposed a hearty vote of thanks to the Engineer, officers, staff, and workpeople, for their services.

Mr. J. Taylor seconded the vote, which was cordially passed.

Mr. J. F. Haseldine, M.Inst.C.E. (Engineer and Manager), returning thanks on behalf of the staff and the workpeople at Barnet, said the employees were happy, and were looking forward to the superannuation scheme.

Mr. Davy also acknowledged the vote for the London staff.

EXTRAORDINARY GENERAL MEETING.

An Extraordinary General Meeting followed, for the purpose of submitting to the proprietors for their approval the Bill which is to be introduced into Parliament by the Company.

The Chairman explained the terms of the measure, which is to give the Company power to carry out further water-works, the parliamentary estimate of the cost of which is £28,000. There are also provisions enabling the Company to establish a pension fund. He moved a resolution approving the Bill.

The Deputy Chairman seconded the motion, which was unanimously agreed to.

BRIGHTON AND HOVE GENERAL GAS COMPANY.

Elimination of Differential Prices.

The Ordinary General Meeting of the Company was held at 5, Great Winchester Street, Old Broad Street, E.C., last Friday—Mr. A. M. PADDON, M.Inst.C.E. (the Chairman), presiding.

The SECRETARY (Mr. H. C. Burton, A.C.A.) read the notice convening the meeting; and the report of the Directors and statement of accounts for the year ended Dec. 31 were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said that the increase in business which had taken place since they met twelve months ago was satisfactory in character; and taken in comparison with similar returns relating to the same period, the increase was rather more marked than they usually encountered. It amounted to 3·7 p.ct., which was equivalent to 82 million c.ft. of gas. The price of gas was reduced during the period under review; and the Company now supplied it at an even rate throughout their differing statutory areas. He did not believe that anybody acquainted with gas administration ever liked differential prices for their own sake. They sometimes were a necessity in equity as between the classes of consumers affected; but Parliament was always reluctant to sanction them at any higher difference than could be demonstrated as fair, and invariably encouraged undertakings (as they had done the Brighton Company, under the special terms of their Act) to remove them as soon as it became practicable to do so. It was a matter of sincere gratification that over such an extended and varying area of supply as their own, it should be possible to eliminate this fruitful source of discontent. He was glad to be able to tell them that the Directors were now in a position to supplement these concessions to the consumers by giving a yet further decrease in price to the prepayment consumers.

IMPORTANCE OF THE PREPAYMENT CONSUMER ELEMENT.

It appeared to him that in the past the importance of the prepayment consumer element in a gas company's accounts had not been appreciated at its proper value; but it was just this part of their business that they could be reasonably confident of retaining in the future. There was a measure of development in connection with the prepayment consumers which had frequently been lacking in the case of the quarterly consumer. He thought himself that the very method of charge had something to do with this. The prepayment consumer knew from day to day where he stood; whereas the quarterly consumer experienced four times a year a little financial shock to which, as a matter of fact, he had not yet become quite accustomed. This, he was perfectly certain, had an immediate—though it might be transient—influence on the dealings of the quarterly consumer with the gas company. The Company had unfortunately lost by death Mr. Lewis Hardy, one of their Auditors; and Mr. William Cash was retiring from office after 33 years' service.

FAVOURABLE RELATIONSHIP OF CAPITAL TO SALES.

During the twelve months there had been expended about £31,000 for capital purposes; but there had been deducted from this on account of depreciation nearly £10,000, leaving something like £21,000 as the net addition, to set against an increase of 82 million c.ft. in the sales of gas. Therefore the relationship between the capital and the business done had been materially improved in the period under review. Actually the capital per million c.ft. of gas sold was under £430, which, taken in connection with the advanced development of the works and the general assets of the undertaking, could certainly be regarded as a satisfactory figure. Charges for repairs and maintenance aggregated a little short of 20d. per 1000 c.ft. A sum of £7512 had been allotted to the co-partners. On this subject, he would like to say that co-partnership had continued its successful development in their undertaking. There was nothing good in these figures that did not owe something to the element which they referred to broadly as co-partnership. The special purposes fund had been increased by £6642, and the renewal fund by £3452.

PUBLIC LIGHTING AT BRIGHTON.

Out of the amount of over £472,000 received for gas, the proprietors would be struck by the absolutely infinitesimal proportion that was on account of public lighting. With regard to the Borough of Brighton, it amounted to 0·3 of 1 p.ct. of all the gas they supplied. He would not, however, have the proprietors infer from this fact that the public lighting of Brighton was economical or even effective, because it did not answer to either of these descriptions. The most outstanding instances of successful public lighting were to be found in the Place de la Concorde, Paris, and Parliament Square, Whitehall, Trafalgar Square, and the main portions of the City of London. These places showed to what a degree of excellence public lighting could be brought. They were all lighted by gas. The use of electricity was doubtless exclusive in its adaptability to certain purposes; but public lighting was not one of them. The proprietors might ask: "Why, then, this apparent neglect of our commodity?" Where a municipality were commercially interested in a public commodity, the inevitable consequence was an arbitrary feeling in favour of the commodity for which they were responsible. He did not blame the municipality; but it was a fact to be borne in mind.

IMPORTANCE OF A GOOD COKE SERVICE.

Referring to the subject of residuals, he said there was no doubt, in the light of experience, that the cheapest method of obtaining hot water for ordinary domestic purposes was to use coke. The smokeless solid fuel the public most wanted, and which would serve them better than any product of low-temperature carbonization, was coke, if only they could have it in the form in which they required it, together with the proper means of dealing with it. The care and attention of the Company to this matter were unremitting; and encouraged by the results that had already accrued, they would persevere by every means in their power—thus supplying to the public one of their prime needs, and one of the greatest causes of domestic economy. In conclusion, he might say that they brought into the profit and loss account about £30,000, and they were taking out over £64,000, which showed that their position had been improved by some £28,000.

The DEPUTY-CHAIRMAN (Mr. G. W. Carey) seconded the motion, which was at once carried unanimously.

Dividends were declared making in the case of the 6 p.ct. and 5 p.ct. standard consolidated stocks a distribution of £7 7s. p.ct. and £6 11s. 9¾d. p.ct. respectively, less income-tax.

The retiring Directors (Messrs. E. L. Burton, G. W. Carey, and J. Cash) were re-elected; and Mr. W. B. Paton, A.C.A., and Lieut.-Colonel. Wilfrid C. Smith, D.S.O., M.C., F.C.A., were appointed Auditors.

The Chairman, Directors, officers, and staff were heartily thanked for their services during the past year; the votes being acknowledged by the CHAIRMAN, Mr. C. H. RUTTER (the Engineer and General Manager), and the SECRETARY.

ADVERTISING GAS AT DERBY.

In the "Derby Daily Telegraph" for March 1, the Derby Gas Light and Coke Company had a whole-page advertisement to show the many uses to which gas may be put in the home and in industry. In this it is stated that, of the many recent achievements of the Company in increasing the use of gas for industrial purposes, the three following instances are remarkable, chiefly because of the keen competition which had to be met.

(1) A 66-B.H.P. gas engine. This was a repeat order which makes a total of 94 B.H.P. supplied to this customer. It speaks for the reliability and economy of town gas engines. The average cost for gas per B.H.P. is only ⅜d. per hour.

(2) A very large gas-heated copper, which holds 230 gallons of water, and is one of the largest supplied and fixed in the Midlands. Special high-power gas burners are used, controlled by six independent taps. Some idea of the dependability of the working costs and the time factor can be realized when it is stated that constant use has proved that, per boil, the variation in cost amounts only to 1d., and the variation in time to six minutes.

(3) A large 3½-ton metal melting furnace, which is giving every satisfaction from the point of view of costs, labour, convenience, and saving of time.

GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDER.

Lincoln Corporation.

To authorize the purchase of scheduled land, and its utilization for gas purposes; to extend the limits of supply; to empower the Corporation to borrow further money; and for other purposes.

DECLARATION OF CALORIFIC VALUE.

Earl Shilton Gas Light and Coke Company, Ltd.—450 B.Th.U. (April 27.)

GAS REGULATION ACT ORDER.

SECTION I.

Lymm Urban District Council.

As from Feb. 17, the maximum price of gas is fixed at 16·4d. per therm.

FISHERY BOARDS AND TAR PRODUCERS.

Plea for Co-Operation.

The Annual Meeting of the National Association of Fishery Boards was held recently at the Hotel Victoria, Northumberland Avenue. Lord GAINFORD, the newly-elected President, occupied the chair.

Mr. J. A. HUTTON, of the Wye Fishery Board, introduced the question of road tarring and dressings, and proposed a resolution that an endeavour should be made to co-operate with the tar producers with a view to the tar sold for road dressings being rendered innocuous to fish, animal, and vegetable life.

Sir MERVYN PEEL, Chairman of the Towy Board, seconded the motion, and said that the rivers were as important to the country as the roads. He could not see that there should be any difficulty in getting some guarantee from the contractors that the dressings they used on the roads should be harmless. In these matters conciliation and co-operation were the things to go for. They should see that the rivers were not used as the dumping grounds for the villages; and every effort should be made to keep them clear from rubbish.

The motion was agreed to.

Continental Union Gas Company, Ltd.—The Directors announce that an interim dividend of 3½ p.ct., less tax at 4s. in the pound, will be payable on April 2 next on the preference stock, on account of the year ending June 30, 1928.

GAS COMPANIES' RESULTS FOR 1927.

DERBY.

An excellent report was presented at the Annual Meeting of the Derby Gas Light and Coke Company, when a final dividend was declared of 5 p.ct., making a total of 8½ p.ct. for the year. It was subsequently determined at an extraordinary general meeting to authorize the issue of £50,000 ordinary consolidated stock at a minimum of 110 p.ct.

Mr. WILLIAM WOOLLEY, who presided, in moving the adoption of the report, said the Company had had an exceptionally good year, and the prospects generally in relation to its affairs were such as to warrant further optimistic anticipations. The capital account had been overspent to the extent of £93,024 through there having been no issue of new capital since 1909. Last year £35,639, chargeable to capital, was expended; the largest sum contributing towards that total being £15,464 for mains and services. No surprise need be experienced in relation to that item when it was remembered that nearly 18¼ miles of new mains had been laid to meet increased demands. The number of consumers had increased by 2484, and gas fires, cooking stoves, and other appliances sold and let out on hire had increased by 6837. The total number now in use was 60,725. It was satisfactory to note that the use of gas, particularly for industrial purposes, showed a marked increase; and the Directors had reason to believe that this increase would continue. Coal, oil, and fuel had cost during the year under review £149,103—£52,353 less than in the previous year, when the protracted coal stoppage involved the purchases of coal at abnormally high prices, and the employment of large quantities of oil. The cost of the reconstruction of retorts at the Litchurch Works was estimated at £50,000, which it was proposed to spread over three years. This, with £3000 extra expenditure on meters and stoves, made a total of £20,000 above the usual reductions taken from profits this year. The total rates paid by the Company during the last twelve months had been £9760—an increase upon the preceding annual period of £1000. The total expenditure for the year had been £325,037, compared with £354,486 last year, being a decrease of £29,449. The revenue derived from the sale of gas had amounted to £247,549, or £9924 more; and rental of meters, stoves, and fittings produced £32,623. This, with residual products and other items, brought the total receipts to £383,778—a decrease of £11,939. The gross profit for the year was £58,741, as compared with £41,231 in the previous year. Unlike most other gas undertakings, they refrained during the coal stoppage from increasing the charge for gas, with the result that their price was one of the lowest in the country. As they had had a prosperous year, they proposed to share that prosperity with their customers by a further reduction in the price of gas from the March quarter by ½d. per therm, or 2½d. per 1000 c.ft. The new prices for lighting, cooking, and heating would be 2s. 11d., and for industrial purposes 2s. 6d. per 1000 c.ft., less discounts up to 10 p.ct., according to consumption. This would cost the Company £18,000 per annum, but they felt it was their duty to do all they could to assist the trade of the district. The dividend was increased by ½ p.ct. for the first half-year, and it was proposed to make a similar increase for the second half-year, making 8½ p.ct. (less income-tax) for the year.

The Chairman paid a tribute to the value of the work of the Company's General Manager and Engineer, Mr. J. Ferguson Bell, M.Inst.C.E., and his assistants, Messrs. McCrae and Fisher, and referred in appreciative terms also to the loyalty of all the employees.

Mr. E. S. JOHNSON, who seconded the adoption of the report, which was agreed to, referred to the fact that when he was appointed a Director of the Company more than thirty years ago, it was one of the most heavily capitalized gas undertakings in the country for the amount of gas turned out. At the present time, however, it was one of the lowest in regard to the price of gas and in capital compared with consumption.

To a cordial vote of thanks, Mr. J. FERGUSON BELL responded on behalf of the staff.

HARROGATE.

Presiding at the Annual Meeting of the Harrogate Gas Company, Mr. FRANCIS BARBER, the Chairman, said that the expenditure of £10,441 on machinery and plant was due in the main to their new coke-handling plant, by which they were able to deliver a fuel of high quality, uniform size, and low moisture. Owing to its good value as a domestic fuel, the demand for it was well maintained. Many who first used it during the coal strike, now looked upon it as an essential part of their fuel supply. Since contracts for taking over the supply in the Knaresborough, Tadcaster, Wetherby, and Boston Spa district, a good deal of pioneer work had been done by their service and fittings department in replacing inadequate mains and service pipes, putting in order consumers' apparatus, &c. Prior to the war, the Board approved plans for the development of their valuable sites in James Street and Cambridge Street—the former for the provision of first-class showrooms and more adequate accommodation for their accountancy and clerical departments, and the latter for much-needed warehouse accommodation and workshops, &c., for their fitting and distribution departments. Before anything was done, the war came. When the war came to an end, and since, the cost of building had been so high that the work was postponed. Though prices had not yet reached the level at which they hoped to begin, it was some satisfaction, now that they could no longer postpone the work, to know that they were considerably less.

After payment of interest and dividends for the year, and co-partners' bonus, their carry-over balance would be increased by £3177, bringing it to £14,356. The success of their business was also shown by the economies effected and the volume of business done. The leakage during the year had been reduced to 3·9 p.ct. Though they had the abnormally high increase of 9·8 p.ct. in 1926, when the consumption reached 516,949,800 c.ft., they had not only maintained that output, but had passed it by some 379,000 c.ft. The appliances sold were made up as follows: 813 gas fires, 546 cookers, 419 wash-boilers, and 398 miscellaneous appliances.

The cost of producing gas for the small populations in rural districts made the sale of it at a reasonable price impossible, and, coupled with the waste due to inefficiency of service, created much prejudice against the use of gas, which reacted upon the industry in a general sort of way. No doubt it led to the supposition that heat could be supplied by electricity in such areas at something like the then prevailing prices of gas. Though they knew this was not so, high cost and inefficiency were a strong invitation to competition. They had already abundant evidence that where gas could be supplied in such areas at a reasonable price, having regard to all the circumstances, its use was there greatly appreciated. Whereas in the Nidderdale extension there were only 253 persons consuming about 2¼ million c.ft. of gas, the number of consumers last year had increased to 753 consuming 11,207,000 c.ft. Though they had reduced the price of gas from 6s. 8d. to 4s. 10d. per 1000 c.ft. net, the result had exceeded their expectations, and so justified their estimated return on the capital involved that a further reduction in price in that area might be shortly expected. The area which had been added by the Board of Trade Order of 1927 afforded exceptional opportunities for the profitable extension of their business. The Nidderdale extension contained five villages with a population of 4378. The area added by their recent Order contained seven villages and semi-suburban areas with a population of 9304, exclusive of Knaresborough. Knaresborough was only separated by the River Nidd from their original area of supply, and was to be supplied with gas at the Harrogate price. Under their contract for the public lighting of Knaresborough, they had already carried out part of their agreed scheme, with the gratifying result that they received from the Urban District Council a resolution of thanks in the following terms: "On the motion of Councillor W. Wright, seconded by Councillor B. Crossland, it was unanimously resolved that the Harrogate Gas Company be congratulated on the great improvement in the illumination of the streets within the Urban District." In conclusion, Mr. Barber thanked Mr. F. H. Robinson (Engineer and Manager) and Mr. A. I. Seaton (Secretary) and their staffs for their devotion to duty in the past year.

The resolution was seconded by Mr. J. W. KNOWLES, and carried unanimously.

Dividends at the authorized rate of 10 p.ct. per annum were declared.

LIVERPOOL.

An increased consumption of gas was reported at the Annual Meeting of the Liverpool Gas Company, and the CHAIRMAN (Mr. H. Wade Deacon) announced an immediate reduction in the price of gas of 0·2d. per therm, which is equivalent to 1d. per 1000 c.ft.

The CHAIRMAN said that, at the end of 1926, they were left with a considerable quantity of high-priced coal. This naturally affected the price of gas during the earlier part of 1927, but he was glad to say that, in spite of this, they had had a satisfactory year, and had been able to reduce the price of gas from 9d. to 8d. per therm during that time.

The quantity of gas sold during 1926 was abnormally increased owing to the scarcity of coal for domestic and general use; and it was very satisfactory to be able to report that there was a further increase of over 72 million c.ft. in the quantity of gas sold during last year. It was clear that they were now reaping the benefit of the greatly increased number of gas cookers, fires, and appliances of various kinds installed recently.

In 1927 the Company had 1073 miles of main, 197,741 meters in use, and sold 7300 million c.ft. of gas—a record figure. They had organized a system of inspection of heating and lighting appliances in use in consumers' premises, for they were satisfied that it was in the interests of both consumers and themselves to see that all appliances were in good condition. This inspection was highly appreciated by the consumers in those districts in which they had made a trial; and they proposed gradually to extend it as might be advisable. They had also completely rearranged the showrooms at the Head Offices. They felt sure that these showrooms would help to increase their business and give satisfaction to the public. It was a source of much gratification to be able to say that the relations existing between the Directors and the whole of the staff and employees were of a most satisfactory nature.

Turning to the revenue account, the cost of coal and oil was reduced by £38,804. There was a reduction of £21,038 in the cost of repairs and maintenance of works and plant; and the total cost of manufacture of gas was £60,268 less than in the previous year. The distribution of gas had cost £13,326 more, chiefly because of the greater expenditure on repairs and renewals of mains and meters. They had been able to reduce the price of gas to ordinary consumers from 9d. to 8d. per therm during the year, but the total yield from the sale of gas was £1,316,213, or £69,799 more than in 1926. The income from fires and cookers was larger, being £26,879, as compared with £22,539 in the previous year. To sum up the revenue account, the total income was £1,625,955, and the total expenditure £1,424,210, so that there remained a balance of £201,745 to carry to net revenue account. This account showed that, after payment of interest for the year, and dividends for the half-year, and providing for the second half-year's dividends, there remained a surplus of £75,125. This compared with £61,550 a year ago. Co-partners' savings were about £4000 more than in 1926. Co-partners now held £51,440 of the stock of the Company.

Mr. ALFRED TYRER (Deputy-Chairman) seconded, and the motion was carried.

The CHAIRMAN: I beg to move "that a dividend be declared for

the half-year ended Dec. 31, 1927, of £2 15s. p.c. on the ordinary stock of the Company, less income tax.

Mr. ERNEST BATESON seconded the resolution, which was carried.

Mr. J. W. SLACK, proposing a vote of thanks to the Chairman and Directors, congratulated the Company on their new showrooms.

The CHAIRMAN, in reply, said that thanks were due to Mr. R. E. Gibson (Engineer) and Mr. Stubbs (Treasurer).

NEWCASTLE.

The Annual Meeting of the Newcastle-upon-Tyne and Gateshead Gas Company was held on Feb. 18—Mr. JOHN EDWARD COWEN (the Chairman) presiding.

The CHAIRMAN, in the course of his remarks, said that the great difference in the revenue expenditure as compared with the previous year was in the amount spent on coal and oil. This showed a decrease of £146,570 after charging the £30,000 which last year was put to a suspense account owing to the abnormal circumstances then prevailing, so that the actual decrease in the cost of coal and oil was over £206,000. Against this they had a big drop in the receipts from residuals. Turning to the income side of the revenue account, gas showed an increase of £4400 and rental of appliances £1300. The quantity of gas sold was practically 1 p.c. above the previous year, which was a smaller increase than usual, and was due to the shortness of money in the district. There had been a greater shortage of money this winter than at any time during, at any rate, the last fifteen years. They had felt this shortage among the prepayment consumers, who had been compelled to economize in their use of gas, and also among the middle classes, who had felt compelled to refrain from ordering what might be termed additional comfort or luxury appliances. The coal and iron and steel trades were not yet in a position to trade on profit-earning lines; and until they were in such a position, they in that district could not expect much improvement.

During the year there had again been a large increase in the number of consumers and in the number of gas appliances fixed in the district; and the increase was continuing in 1928. For the past year the figures were as follows: Additional consumers, over 5000; additional cooking appliances, over 7000; additional heating appliances, over 6500; additional wash-boilers and other water-heating appliances, over 5500. Over 20,000 gas-lighting pendants and brackets had been supplied. The number of gas-lighted public lamps in the district had increased by 587, making the total 18,500; and the gas lighting of the streets was a credit to the district.

The final result was that, after providing interest on debenture stocks and the interim dividends on preference and ordinary stocks, there remained for appropriation £84,205, *plus* £29,284 brought forward from 1926. It was proposed to replace in the reserve fund £20,000 of the £30,000 withdrawn last year; to pay final dividends on the preference and ordinary stocks, making for the year 4 p.ct. on the preference stock and 5 p.ct. on the ordinary stock; and to carry forward to the 1928 accounts £34,738. The Directors considered the results to be eminently satisfactory.

In 1925 many gas undertakings increased their prices, and in 1926 most undertakings made substantial increases as a result of the mining dispute, and some of them had not yet got their prices down to those ruling before the dispute. This Company not only passed through both periods without any increase, but reduced the price from the meter readings in December last. The price was therefore now the lowest since 1921, and would allow the distribution of a slightly higher dividend for 1928.

A contract had been entered into with the Consett Iron Company for the supply over a period of years of a large daily quantity of gas from coke ovens now being erected by the Iron Company near Swalwell. It was expected that this supply would be available about the end of the present year. One result of this arrangement would be that they would have much less gas coke to sell on the export market, where competition with fuels of other brands and countries was now very keen. The Directors were satisfied that this contract would be beneficial to both consumers and shareholders.

THE TYNEMOUTH UNDERTAKING.

At an Extraordinary Meeting in September last, the shareholders approved of an application to the Board of Trade, under section 10 of the Gas Regulation Act, 1920, for the acquisition of the Tynemouth Gas Company. An inquiry was held by the Board of Trade on Dec. 2 and 3. The Newcastle Company contended that the price of gas in Tynemouth under a separate company could never be as low as in Newcastle, owing to geographical and other reasons, and that, therefore, there should be a permanent difference in price between the two areas. The opposition asked for the price in Tynemouth to be the same as in Newcastle. This would have resulted in the Newcastle consumers subsidizing Tynemouth consumers—a proposal to which they could not agree. They therefore asked that the price chargeable in Tynemouth, Whitley Bay, and Monkseaton should be higher than in Newcastle, and after the first three years 1d. per therm higher; the consumers in both areas sharing *pro rata* in the economies and advantages of amalgamation through any general reductions in price which from time to time might be possible.

The Board of Trade had decided, subject to the same being passed by Parliament, that the difference in price as compared with Newcastle should be 1·2d. for three years, 1d. for a further three years, and thereafter 0·8d. per therm. The Order was now before Parliament and it was hoped, would be passed during the early days of March. In anticipation of this, they had promised to reduce the price of gas in the Tynemouth area as from the meter readings in December last to the 1·2d. above the present Newcastle price as prescribed in the Order, and subject to the larger average discounts allowed by the Newcastle Company.

The Directors were convinced that the amalgamation would be of advantage to the consumers in the areas of both Companies. The Newcastle Company would take possession from the date of the passing of the Order. In view of this amalgamation, the vacancy on the Newcastle Directorate had not been filled up, as one of the conditions of the agreement with the Tynemouth Company was that one of the Directors of the Company should join the Newcastle Board.

With the Tynemouth amalgamation in view, with their contract for coke oven gas, and with a real revival in trade in their district, he ventured to say that the prospects of the Company were extremely bright, and its various stocks a sound investment.

Mr. J. W. ELLIS seconded the resolution, and it was carried unanimously.

At a subsequent Extraordinary General Meeting, a resolution was passed authorizing the issue of redeemable debenture stock for the redemption of the stock issued in 1918.

WELLINGTON.

The Annual Meeting of the Wellington Gas Company was held on Feb. 21—Mr. C. W. LEAKE (Chairman of Directors) presiding. A profit of £7020 was recorded in the report for the year ended Dec. 31, 1927; and the Directors recommended the payment of a dividend at the rate of 6½ p.ct. on the redeemable preference and ordinary stocks for the second half-year ended Dec. 31 last, making, with the interim dividend already paid, 6½ p.ct. for the year, less tax. Gas sales, it was reported, showed an increase of 3·4 p.ct. The new carbonizing plant, which was brought into operation in the autumn of 1927, had proved very satisfactory.

Alluding to the price of gas, the Directors reported that the increase in the price, necessitated by the high cost of coal during the coal stoppage of 1926, was considerably reduced at the end of the March quarter of 1927, and wholly removed at the end of the June quarter. A further reduction of 2d. per 1000 c.ft. had since been made. This came into operation during the first quarter of 1928.

Mr. R. J. MILBOURNE (Vice-Chairman) seconded the adoption of the report and accounts.

YORK.

Another year of satisfactory progress by the York Gas Company was reported at the Annual Meeting, when Mr. ALFRED PROCTER, Chairman of Directors, announced a reduction in the price of gas. The report of the Directors and accounts for the year revealed the profit for 1927 to have been £19,487, which, added to the balance of net revenue of £7174 brought forward from the previous year, made a total to the credit of profit and loss account of £26,661.

The CHAIRMAN, moving the adoption of the report and accounts, said that the profits had enabled them to recommend a dividend of 5 p.ct. on the ordinary stock, and to carry forward to the 1928 account the sum of £9211; being an increase of £2037 over the previous year. The output of gas was 806 million c.ft.

He had an announcement to make regarding the price of gas. The coal strike of 1926 involved them in an extra cost in the purchase of coal of nearly £40,000 besides other incidental and extraordinary costs, and they asked the consumers to bear only about £18,000 of that extra cost; the remainder being carried by the Company. The pre-strike price was 7½d. per therm, the equivalent of 3s. per 1000 c.ft. From October to Nov. 8, 1926, they raised the price to 8¾d. per therm, and from Nov. 8 to the end of December to 10d. per therm. In January, 1927, they reduced the price to 8d. They were now satisfied that the present circumstances warranted their making a reduction of ½d. per therm, which would bring the price back to the pre-strike figure of 7½d. This reduction would take effect as from the March readings of the meters. He had also to announce another concession to consumers. Under their statutory powers they had hitherto made to the consumers in certain outlying districts an additional charge. The consumption in those areas had grown to such a satisfactory extent that they had come to the conclusion that the time had arrived when it was right to standardize the price to be charged throughout the area of supply. Therefore, concurrently with the reduction in the price, the rate to be charged would become uniform throughout the whole area. Prepayment meter consumers would, of course, get the benefit of the reduction in the form of an equivalent return made at the time of collection.

They had again to record an enormous expansion in the output of gas apparatus, and particularly in the sale of appliances of all kinds for the fitting up of new buildings. It had been most gratifying to find that architects and builders had come to realize the advantage of the adequate equipment of new property with gas cooking and heating appliances. Their travelling showroom had been taken to Poppleton, Acomb, Bishopthorpe, and New Earswick, where it had aroused the greatest interest in the use of gas.

As he had laid before them a satisfactory record of the affairs of the undertaking for the past year, it was right that they should remember their obligations to those who had made that success possible; and it was with great pleasure that he spoke of the continued excellence, vigour, and efficiency of their Manager and Engineer, Mr. H. E. Bloor, and also expressed appreciation of the loyal service given by the whole staff both at the offices and at the works.

Mr. J. J. HUNT seconded, and the report and accounts were approved.

The CHAIRMAN moved that dividends at the rate of 4 p.ct. per annum on the "A" preference stock, and 5 p.ct. per annum on the consolidated ordinary stock, be declared for the year ended Dec. 31 last.

Mr. HUNT seconded, and the resolution was agreed to.

Mr. HUNT moved that the best thanks of the stockholders should be given to the Manager and staff for their efficient service. The past year had been one of particular interest with regard to the staff; Mr. T. P. Cooper having completed fifty years of service—a record which had been suitably acknowledged by the Directors and the staff. They had several officials who were approaching fifty years' service with the Company, which he thought spoke volumes for the good feeling which existed. Mr. C. E. Metcalfe, who was a junior assistant in the works, had left to take a responsible appointment in the South. During the year Mr. Bloor had been appointed a member of the British Road Tar Association, and also Vice-Chairman of the board of management of the Yorkshire Co-Operative Tar Scheme.

GAS UNDERTAKINGS IN IRELAND.

Board of Trade Census of Production (1924).

The census of production for Northern Ireland for the year 1924 just published in "The Board of Trade Journal" shows that in that year gas undertakings used £500,000 of materials and had a gross output of £891,000. They employed 1524 persons, and the net output per person was £257. In the gas undertakings the selling value of coal gas and water gas in 1912 was £295,000, but this figure was more than doubled in 1924, being £635,000. The comparative figures for coke and breeze were 92,800 tons, £87,000 in 1912; and 67,800 tons, £134,000 in 1924.

It is interesting to note that other bye-products in 1912 only realized £5000, against £50,000 in 1924. The total gas made in 1924 was 4583 million c.ft. The output of companies rose from £63,000 in 1912 to £136,000 in 1924, and that of public authorities £354,000 to £753,000.

REDUCTIONS IN PRICE OF GAS.

Burnley.—The price in Burnley has again been reduced, from and after the next meter reading this month, by ½d. per therm. This will bring the price to ordinary consumers down to 7½d. per therm; and for all consumers who use 50 therms per quarter, the charge is now 6½d. per therm in all areas of supply within and without the borough. This is the lowest price at which gas has been sold in Burnley since the termination of the war, and the latest reduction is the third during the past twelve months. The first was 1d. per therm in March, 1927, by which the price of gas had been increased for one quarter due to the coal dispute; a second reduction of 1d. per therm was made from Dec. 25, 1927; and there is the present reduction of ½d. The maximum price for power will be 5½d. per therm, with scale reductions down to 4d. per therm according to quantity consumed. All the prices are subject to 5 p.ct. discount for payment within a specified period.

Calverley.—The Calverley and Horsforth District Gas Company have decided to reduce the charge for gas by 1d. per therm, as from the meter readings for the quarter ending March 31.

Coventry.—A further reduction in the price of gas in Coventry, equal to about 2d. per 1000 c.ft., is recommended by the Coventry Gas Committee, to take effect after the March readings of the meters. The revised scale will bring down the price to a figure slightly below that obtaining before the coal stoppage in 1926.

East Hull.—The East Hull Gas Company have decided to reduce the price of gas in the eastern district of Hull (including Sutton) from 7½d. to 7d. per therm (*i.e.*, to 2s. 7½d. per 1000 c.ft.), and in the newly-acquired district (including Hedon) from 1s. 3d. to 1s. per therm (*i.e.*, to 4s. 6d. per 1000 c.ft.).

Hemsworth.—The Hemsworth, Grimethorpe, and District Gas Company have decided to reduce the charge for gas, as from April 1, by 2½d. per 1000 c.ft. Last April there was a reduction of 5d. per 1000 c.ft.

Hull.—The British Gas Light Company, Ltd., announce that on and after the reading of the meters for the quarter ending March 31 the price of gas will be reduced from 7½d. to 7d. per therm.

Launceston.—The Launceston Gas Company announce a reduction in the price of gas as from Jan. 1 last of 6d. per 1000 c.ft.

Leeds.—The Leeds Corporation Gas Committee decided on Feb. 28 to recommend a reduction of 5d. per 1000 c.ft. for gas, bringing the price down from 4s. 2d. to 3s. 9d. The Gas Department began the year with a deficit of £30,764, owing to the 1926 coal stoppage, but that has now been wiped out. There has been a net profit (after clearing off the deficit) on the past year's working of £2876; and next year's surplus is estimated at £3310, despite the fact that the cost of the reduction in price to the Department will be some £64,000. The reduction, if approved by the City Council, will take effect from April 1.

Midsomer Norton.—The Midsomer Norton Gas Company have decided to reduce the price by 1d. per therm as from April 1.

Plymouth.—The Plymouth and Stonehouse Gas Light and Coke Company announce that, as from the readings of the meters on Lady Day, the price of gas will be reduced to 6·5d. per therm for ordinary consumption (equal to 2s. 5½d. per 1000 c.ft.) and 5·9d. per therm for engine consumption. The present price to ordinary consumers is 7·3d. per therm.

Wallasey.—The Wallasey Council propose to reduce the price by 2d. per 1000 c.ft. (from 3s. 2d. to 3s.).

ENAMELS FOR SHEET IRON.

One of the features of the study of light-coloured first-coat enamels has, according to the United States Department of Commerce "Technical News Bulletin," been the development of a test for adhesiveness of the enamel to the metal. Variations in the cooling treatment of the test specimens have been tried. The differences in strength caused by these variations is neither as marked nor as consistent as might be expected; but slow cooling in the furnace was selected as the one leading most consistently to maximum strength. As an illustration of the effect of firing treatment upon adhesiveness, a composition similar to a standard cobalt ground coat, except that the cobalt, manganese, and nickel oxides were omitted, has been applied over test pieces prepared in various ways.

In the following table will be seen the treatment given the iron, the average breaking strength for each treatment, and the percentage of failures which occurred in the iron-enamel bond. The remainder of the failures occurred in the enamel itself:

Treatment of Iron.	Breaking Strength, Lbs.	Failure in Bond. P.Ct.
Ordinary treatment	400	100
Thin coating of iron oxide caused by heating the metal	434	98
Thin coating of cobalt oxide powder rubbed on metal	514	3
Metal dipped in—		
2 p.ct. suspension of cobalt oxide in water	662	45
2 p.ct. solution of nickel ammonium sulphate	684	90
2 p.ct. solution of cobalt chloride	632	85
2 p.ct. solution of cobalt ammonium sulphate	464	87
2 p.ct. solution of cobalt sulphate	590	87

It is pointed out that these data are to be considered merely as indications of the relative results which may be expected under stated conditions. It is apparent from them that treatment of the iron before application of the enamel offers promising possibilities, and is a field worthy of further investigation.

TRADE NOTES.

Machine Tools.

Soag Machine Tools, Ltd., 45, Horseferry Road, Westminster, have published a new catalogue illustrating their machine tools.

Retorting Plant for Oil Shale.

Patent Retorts, Ltd., of 5, Victoria Street, S.W. 1, have secured a contract from New Consolidated Gold Fields, Ltd., for the supply and erection of their retorting plant for treating oil shale.

Pan Ash Recovery Plant for Belfast.

On the recommendation of Mr. J. D. Smith, the Belfast Gas Manager, the tender of Messrs. George Waller & Sons, Ltd., of Phœnix Iron Works, Stroud, has been accepted for a pan ash recovery plant for the Belfast Gas-Works.

Sands, Clays, &c., for Industrial Purposes.

Mr. A. L. Curtis, of Westmoor Laboratory, Chatteris, has just published the fourth edition of his brochure on "Sands, Clays, and Economic Minerals for All Industrial Purposes." Mr. Curtis, who undertakes to supply any type of sand, &c., offers his advice to users.

Orders for Tully Plants.

Messrs. Tully, Sons & Co., Ltd., of Newark-on-Trent, have received an order from the Wick Gas Company for a 150,000 c.ft. per day complete gasification plant, which is a repeat order. The firm have also on order for the Faringdon Gas Company one of their oil carburetted complete gasification plants with mechanical operator, similar to the one in operation at the Littlehampton Gas-Works and the one now being installed at Kettering. These machines effect considerable saving in both fuel and labour, and form a useful addition to water gas plant.

The London Electric Firm.

The firm have just secured an order for some searchlights of extraordinary size, about 7 ft. in diameter. These are larger than anything hitherto constructed in this country, and among the largest ever made in any other country. They will have a range of many miles. In addition, the firm are engaged on naval and other searchlights (including high-intensity) for home and foreign Governments, besides the new "Super-Suez" type, and "Life-Saving," "Fire-Brigade," "Cinema Studio," "Pilot House," and commercial patterns down to 6-in. diameter.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *March 5.*

There are a fair number of inquiries in the market for pitch, and a firmer tendency prevails.

Creosote is steady at about 8¾d. per gallon.

Benzole is 1s. 5d. to 1s. 6d. per gallon; pure toluole, about 1s. 10d. per gallon; 95/160 solvent naphtha, 1s. 3d. per gallon; and pyridine, about 6s. per gallon.

Tar Products in the Provinces.

March 5.

The average prices of gas-works products during the week were: Gas-works tar, 44s. to 49s. Pitch—East Coast, 55s. to 57s. 6d. f.o.b. West Coast—Manchester, 52s. 6d. to 55s.; Liverpool, 55s. to 57s. 6d.; Clyde, 57s. 6d. to 60s.* Benzole, 90 p.ct., North, 11½d. to 1s. 0½d.; crude, 65 p.ct. at 120° C., 9d. to 9½d., naked at makers' works; 50/90 p.ct., naked, North, 1s. 2d. to 1s. 3d.; Toluole, naked, North, 1s. 3d. to 1s. 4d. nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 8¾d. to 9¼d. Heavy naphtha, North, 8¾d. to 9¼d. Creosote, in bulk, North, liquid, 7½d. to 7¾d.; salty, 7¾d. to 7½d. Scotland, 7½d. to 7¾d. Heavy oils, in bulk, North, 8¾d. to 9¼d. Carbolic acid, 60 p.ct., 2s. 3d. to 2s. 4d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

*Owing to a typographical error, the Clyde price for pitch in last week's issue was given as 57s. 6d. to 66s. The figures should have read 57s. 6d. to 60s.

STOCK MARKET REPORT.

EXTRAORDINARY activity and strength continued to characterize dealings in Industrial shares last week. Most of the business done was in Gramophones and other similar shares, and record high values were reached. The excitement, however, spread in other directions, and increased the volume of business. Investment business was on comparatively small lines; but gilt-edged securities were unaffected by the adverse monetary movements and the reappearance of the unknown buyer in the gold market. Prices were well maintained, particularly of Conversion and Funding loans. War Loan also was somewhat firmer, and was not influenced by the underwriting of the new £8,000,000 5 p.ct. Australian loan which is offered this week at 98.

The Foreign stock market was upset by the unsatisfactory development in Egyptian affairs; but Chinese bonds and French National bonds showed a further slight recovery.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Mar. 2.	Rise or Fall on Week.	Transaction Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Feb. 9	5	5	Aldershot 5 p.c. max. C.	70—75	..	..
412,992	,,	,,	4	4	Do. 4 p.c. Pref.	69—72	..	..
1,651,868	,,	Sept. 29	7	7	Alliance & Dublin Ord.	95—99	..	97
274,000	,,	Jan. 12	4	4	Do. 4 p.c. Deb.	64—67	..	65½—66½
623,654	,,	Aug. 25	—	7	Barnet Ord. 7 p.c.	109—112	+2	..
300,000	1	Oct. 18	1/7½	1/7½	Bombay, Ltd.	21/6—23/6	..	..
170,000	10	Aug. 25	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
500,000	10	,,	7	7	Do. B 7 p.c.	12—12½	..	..
375,000	10	,,	6	6	Do. Pref. 6 p.c.	10⅝—11¼	..	..
50,000	Stk.	Jan. 12	3	3	Do. 3 p.c. Deb.	56—59	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	75—78	..	..
357,900	,,	Aug. 25	—	7½	Brighton & Hove 6 p.c. Con.	115—118	+3	..
341,860	,,	,,	—	6/8/6⅔	Do. 5 p.c. Con.	108—106	+3	..
1,367,500	,,	Feb. 23	5	5	Bristol 5 p.c. max.	87½—88½a*	..	..
855,000	,,	Sept. 29	7	8	British Ord.	112—115	..	113½—115
100,000	,,	Dec. 22	7	7	Do. 7 p.c. Pref.	114—117	..	..
150,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—76	..	..
200,000	,,	,,	—	33/2	Do. 5 p.c. Red. Deb.	93—96	..	..
100,000	10	Nov. 24	8	8	Cape Town, Ltd.	8—9	..	..
100,000	10	Oct. 27	4½	4½	Do. 4½ p.c. Pref.	6¾—7½	+½	6⅞
150,000	Stk.	Dec. 22	4½	4½	Do. 4½ p.c. Deb.	72—77	..	74—75½
636,850	,,	Feb. 23	6	6	Cardiff Con. Ord.	93—101*	..	..
257,860	,,	Jan. 12	7½	7½	Do. 7½ p.c. Red. Deb.	101—104	..	..
187,150	,,	Feb. 23	5	5½	Chester 5 p.c. Ord.	86—91b	+1½	..
79,185	1	Oct. 18	1/2/-	1/2/-	Colombo Ltd. Ord.	31/—33/-	..	..
24,495	1	,,	1/4/4	1/4/4	Do. 7 p.c. Pref.	20/—22/-	..	..
375,402	1	Oct. 18	1/9‡	1/9‡	Colonial Gas Assn. Ld. Ord.	24/—26/-	..	25/3
197,842	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	21/—23/-	..	..
2,073,280	Stk.	Feb. 23	5	7	Commercial Ord.	97—100*	..	96½—98½
475,000	,,	Dec. 22	8	8	Do 8 p.c. Deb.	57—60	..	58
800,000	,,	Sept. 29	‡1	‡1	Continental Union, Ltd.	28—33	..	28
200,000	,,	,,	7	7	Do. 7 p.c. Pref.	90—95	..	90
787,850	,,	Aug. 11	8½	8½	Croydon sliding scale	105—108	+3	..
408,100	,,	,,	8	8	Do. max. div.	83—86	..	84—85
492,270	,,	Aug. 25	9	8	Derby Con.	108—105e	..	..
85,000	,,	Dec. 22	4	4	Do. Deb.	71—73e	..	..
209,000	,,	Aug. 25	5	5	East Hull Ord. 5 p.c.	78—81	..	..
50,000	,,	Dec. 22	5	5	Eastbourne 5 p.c. Deb.	90—95	..	..
1,092,180	10	Sept. 29	‡3	‡4	European, Ltd.	8½—9½	..	8½—8⅝
18,703,480	Stk.	Feb. 9	5	5/1/4	Gas Light & Coke 4 p.c. Ord.	18/10½-19/1½f	—/1½	18/10½—19/3
2,800,000	,,	,,	8½	8½	Do. 8½ p.c. max.	62—64	..	63¼
4,187,690	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77—80	..	78¼—79½
5,602,620	,,	Dec. 22	8	8	Do. 8 p.c. Con. Deb.	60—62	..	60—60¼
181,315	,,	,,	6	6	Do. 6 p.c. Br'tf'd Rd. Db.	102—105	..	..
1,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	99—101	..	101
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
93,500	,,	Aug. 25	6⅔	6⅔	Hastings & St L. 5 p.c. Conv	89—92	..	..
268,740	,,	,,	5½	5½	Do. 5½ p.c. Conv.	70—73	..	..
70,000	10	Oct. 18	‡10	‡10	Hongkong & China, Ltd.	12½—13½	..	..
172,200	Stk.	Aug. 25	5	5	Hornsey Con. 5½ p.c.	76—79	..	..
1,976,000	,,	Nov. 10	10	10	Imperial Continental Cap.	149—152	..	149—152
283,130	,,	Feb. 9	8½	8½	Do. 8½ p.c. Red. Deb.	97—99	..	..
235,242	,,	Aug. 11	6½	7	Lea Bridge 5 p.c. Ord.	96—99	..	..
2,145,907	,,	Feb. 23	5½	5½	Liverpool 5 p.c. Ord.	87½—88½b	+¾	..
600,000	,,	Sept. 29	7	7	Do. 7 p.c. Red. Pref.	103—105b	..	..
165,736	,,	Feb. 23	9	8	Maidstone 5 p.c. Cap.	104—109*	..	..
75,000	5	Dec. 22	‡7	‡8	Malta & Mediterranean	5½—5¾	..	..
541,920	Stk.	Nov. 24	‡7	‡6	Montevideo, Ltd.	92—94	..	..
2,061,315	,,	July 28	5	5	Newcastle & Gateshead Con.	16/—16/6d f	—/3	..
860,929	,,	,,	4	4	Do. 4 p.c. Pref.	67½—69½d	..	..
691,705	,,	June 29	8½	8½	Do. 8½ p.c. Deb.	66½—67½d	..	..
131,780	,,	Aug. 25	—	6/18/0	North Middlesex 6 p.c. Con.	93—96	..	..
800,000	,,	Nov. 24	7	9	Oriental, Ltd.	116—121	..	..
188,120	,,	Dec. 22	7⅜	7⅜	Plym'th & Ston'house 5 p.c.	102—107	..	..
414,500	,,	Feb. 23	7½	7½	Portsm'th Con. Stk. 4p.c. Std.	99—102*	..	..
986,732	,,	,,	5	5	Do. 5 p.c. max.	74—77*	..	..
1,334,464	1	—	—	—	Primitiva Ord.	20/6—21/6	+-/3	20/4½—21/3
247,500	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	92—95	..	..
695,000	Stk.	Jan. 26	4	4	Do. 4 p.c. Red. Deb. 1911	74—76	..	..
429,186	,,	Dec. 22	4	4	Do. 4 p.c. Cons. Deb.	74—76	..	75½
150,000	10	Sept. 29	6	6	San Paulo 6 p.c. Pref.	8½—8¾	..	8½
125,000	50	Jan. 3	5	5	Do. 5 p.c. Red. Deb.	46—48	..	..
870,000	Stk.	Sept. 8	5⅔	5⅔	Sheffield A	102—104e	..	..
419,968	,,	,,	5⅔	5⅔	Do. B	102—104e	..	..
1,047,000	,,	,,	5⅔	5⅔	Do. C	102—104e	..	..
90,000	10	May 26	4	6	South African	4—6	..	..
6,802,895	Stk.	Feb. 23	5	7½	South Met. Ord.	103—105*	..	103½—104½
500,000	,,	,,	—	6	Do. 6 p.c. Irred. Pf.	108—111*	..	..
1,895,446	,,	Jan. 12	3	3	Do. 3 p.c. Deb.	59—62	..	60
794,000	,,	Sept. 8	6½	6½	Do. 6½ p.c. Red. Db.	102—104	..	103
21,500	,,	Feb. 23	8½	8½	South Shields Con.	108—110d*	—8	..
1,348,796	,,	Feb. 23	6½	6½	South Suburban Ord. 5 p.c.	103—106*	..	104½—105⅝
868,837	,,	Dec. 22	5	5	Do. 5 p.c. Deb.	93—96	..	..
647,740	,,	Sept. 8	5	5	South'mpton Ord. 5 p.c. max.	79—82	..	..
131,375	,,	Dec. 22	4	4	Do. 4 p.c. Deb.	72—75	..	..
250,000	,,	Aug. 25	7	7	Swansea 7 p.c. Red. Pref.	103—106	..	..
200,000	,,	Dec. 22	6½	6½	Do. 6½ p.c. Red. Deb.	99—102	..	..
190,000	,,	Feb. 22	7⅜	7⅜	Tottenham District A 5 p.c.	110—115*	+3	..
893,276	,,	,,	6½	6½	Do. B 8½ p.c.	92—95*	+2	..
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	95—98*	..	..
181,325	,,	Dec. 8	4	4	Do. 4 p.c. Deb.	74—77	..	..
358,251	,,	Sept. 29	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, & Wycombe 5 p.c.	80—82d	—1	..
289,094	,,	Aug. 25	6½	6½	Do. 5 p.c. pref.	90—93	..	..
88,830	,,	,,	5	5	Wandsworth, Wimbledon, and Epsom—	85—90	..	..
80,000	..	July 14	8½	8½	Wandsworth A 5 p.c.	132—137	+2	..
255,686	,,	,,	7	7	Do. B 8½ p.c.	113—118	+3	..
432,535	,,	,,	5/19/0	5/19/0	Do. C and New	100—105	+3	..
852,000	,,	,,	6⅔	6⅔	Do. Wimbledon 5 p.c.	108—113	+3	106⅞—108½
98,000	,,	,,	7½	7½	Do. Epsom 5 p.c.	115—120	+3	..
200,000	,,	,,	5	5	Do. 5 p.c. Pref	88—93	..	..
88,416	,,	Dec. 22	8	8	Do. 8 p.c. Deb.	56—59	..	..
284,742	,,	,,	4	4	Do. 4 p.c. Deb.	75—78	..	..

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle e.—Sheffield. f.—The quotation is per £1 of Stock. * Ex. div. † Paid free of income-tax. ‡ For year.

The various gas companies' accounts show, without exception, satisfactory results for the past year. This has brought about a demand for stocks which cannot in many cases be met. Prices are slowly but steadily improving, with the consequent lessening in the yield. Except in a few companies, the two large Metropolitan and the more important provincial companies, the average yield is now about 6 p.ct., and where it is higher it may be taken for granted that no stock is available. Some appreciable increases were made in the quotations. Both the Brighton and Hove stocks, the Croydon sliding-scale stock, Tottenham "A," and four out of the five Wandsworth stocks were marked up 3 points, Barnet ordinary, Tottenham "B," and Wandsworth "A" 2 points. The enthusiasm for the £1 quotation stocks eased off slightly; both the Gas Light ordinary and Newcastle consolidated being marked down 1¼d. and 3d. respectively. Among the dividend announcements of the past week are the Lea Bridge 7 p.ct., as compared with 6½ p.ct., and the North Middlesex £6 18s. on the converted 6 p.ct. consolidated stock.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 4 p.ct. debenture 65¼, 66, 66¼, British 113¾, 114¾, Cape Town 4½ p.ct. preference 6⅞, Commercial 96½, 97, Croydon maximum dividend 85, Gas Light and Coke 19s., 19s. 0¾d., 19s. 2¼d., 19s. 3d., 4 p.ct. preference 78½, 79½, 3 p.ct. debenture 60, 60¼, Imperial Continental 151, Newcastle 3¼ p.ct. debenture 67½, Primitiva 20s. 4½d., 20s. 9d., 4 p.ct. debenture 75½, South Metropolitan 104, 104⅜, 104½, 3 p.ct. debenture 60, Wandsworth, Wimbledon 5 p.ct. 107½.

On Tuesday, Alliance and Dublin 4 p.ct. debenture 66¼, Commercial 98¼, 3 p.ct. debenture 58, Gas Light and Coke 18s. 10¼d., 19s., 19s. 0¾d., 19s. 1½d., 4 p.ct. preference 79, Imperial Continental 149, 151, Primitiva 20s. 7½d., 20s. 9d., 20s. 10½d., 21s., 21s. 1½d., South Metropolitan 104, 104 5/16, 104⅜, South Suburban 104½, Wandsworth, Wimbledon 5 p.ct. 107.

On Wednesday, Cape Town 4½ p.ct. debenture 74, 75, 75½, Commercial 97½, Gas Light and Coke 19s., 19s. 1½d., 4 p.ct. preference 78⅜, 79, 3 p.ct. debenture 60, 60⅜, Imperial Continental 150½, Primitiva 20s. 10½d., 21s. 1½d., 21s. 3d., South Metropolitan 103⅜, Wandsworth, Wimbledon 5 p.ct. 106 5/16. Supplementary prices, Barnet 4 p.ct. debenture 72, 72½, Liverpool 5 p.ct. 87½.

On Thursday, Alliance and Dublin 97, 4 p.ct. debenture 66, British 114, 114¼, 114⅜, 115, Colonial Association 25s. 3d., Commercial 97, 97½, Continental Union 28, 7 p.ct. preference 94, Gas Light and Coke 19s., 19s. 1½d., 3 p.ct. debenture 60, 60⅜, Imperial Continental 151, Primitiva 20s. 10½d., 21s. 1¼d., 21s. 3d., South Metropolitan 103½, 103⅜, 6½ p.ct. debenture 103, South Suburban 105⅜, Wandsworth, Wimbledon 5 p.ct. 108½. Supplementary prices, Liverpool 5 p.ct. 88, 88½.

On Friday, British 114¼, 115, Commercial 98⅛, 98½, Croydon maximum dividend 84, European 8½, 8⅝, Gas Light and Coke 18s. 10½d., 19s., 3⅜ p.ct. maximum 63¼, 4 p.ct. preference 79½, 5 p.ct. debenture 101, Imperial Continental 150½, 152, Primitiva 21s., 21s. 3d., San Paulo 6 p.ct. preference 8 17/32, South Metropolitan 104½, 104⅜, South Suburban 5 p.ct. 104½. Supplementary prices, Barnet 4 p.ct. debenture 75, Farnham additional ordinary, 11 1/16, 11 1/16.

Loanable credit assisted by dividend disbursements was plentiful at the end of the week. Loan rates declined further, and at the close both new and old advances were obtainable at 3 p.ct. The abundance of money tended to depress discount rates, and the average at which Treasury bills were allotted dropped about 9½d. p.ct. to £4 2s. 8·47d. p.ct. On the Foreign Exchange market, the Dollar moved against sterling, and there was a decline of 1/32 cents to 4.87 23/32. Italian lire showed further depreciation, and the Milan rate closed higher at 92.34⅜. Belgian currency recovered sharply, the rate declining to 35.00½. Dutch florins were slightly higher at 12.12⅝; Pesetas were practically unchanged at 28.87½; and the average rate of French francs remained at 124.

Silver was quiet, with a cash price of 26 3/16d. per oz. Gold was unaltered at 84s. 11½d.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21. Bankers' deposit rates are 2½ p.ct. The deposit rates of the discount houses are 2½ p.ct. at call and 2¾ p.ct. at notice.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

There has been no improvement in the market during the past week, and, by accumulation, the dullness is becoming very pronounced. Buyers from the Continent are still holding off, possibly in the hope of eventually receiving the benefit of the recent wages reduction. The agreed minimum price scheme in Northumberland is still operative, but is at present merely having the effect of producing idle time at the collieries. This was to some extent anticipated, and the collieries are hoping, if they keep it up, that they will eventually benefit. Discussions on the same subject are still proceeding among the Durham owners, but here the classification of brands is a far more complicated matter, and the formulation of any scheme is fraught with great difficulty. In the meantime, collieries are making every effort to maintain prices, but are getting no trade.

Wear Special gas are quoted at 16s. f.o.b., and best qualities at 15s. 3d. Good seconds ask 13s. 6d. to 13s. 9d., other qualities being down to 13s. Trade for coking coals is scarce, and they are weak at nominally 13s. 3d. to 13s. 9d. Bunker trade is slow, and even best qualities, while quoting 14s. 6d., are finding very little new business at any price. Seconds are plentifully offered round 13s. to 13s. 6d. The demand for gas coke is quiet, and supplies are offering at 21s. 6d. f.o.b. for shipment.

YORKSHIRE AND LANCASHIRE.

Inquiries for gas coals are being made rather earlier than usual, due probably to the possible effect on prices of the Five Counties Scheme. So far, however, no combined effort appears to have been made with a view to the stabilization of prices. Some groups are endeavouring to maintain a level a little nearer the cost of production, but, generally speaking, the accepted figures are much below the anticipated standard.

Industrial fuel is fairly steady, but is inclined to weakness for prompt business.

Export is confined chiefly to small parcels for prompt shipment.

The demand for domestic fuel is much below the average for the time of the year, and collieries, as a result, are working shorter time. The request even for secondary qualities and bagging coals has moderated, and in some cases prices have been reduced to meet the situation.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 15s. to 15s. 3d.; screened gas coal, 15s. 6d. to 16s.; washed trebles, 16s. to 16s. 3d.; washed doubles, 14s. 6d. to 14s. 9d.; washed singles, 14s. 6d. to 14s. 9d.; washed smalls, 11s. 3d. to 11s. 6d.; smithy peas, 17s. 6d. to 18s. 6d. per ton. West Yorkshire—Hartley's, f.o.b. Goole, 14s. 3d. to 15s.; screened gas coal, 14s. 6d. to 15s. 6d.; washed trebles, 15s. to 16s.; washed doubles, 14s. 9d. to 15s.; washed singles, 14s. 3d. to 15s.; washed smalls, 10s. 9d. to 11s. 3d.; unwashed trebles, 14s. 9d. to 15s. 3d.; unwashed doubles, 10s. 9d. to 11s.; rough slack, 9s. 6d. to 10s.; coking smalls, 9s. to 9s. 6d. per ton. Derbyshire and Nottinghamshire—Top hards, 15s. to 16s.; washed trebles, 15s. 6d. to 16s.; washed doubles, 15s. to 15s. 6d.; washed singles, 15s. to 15s. 6d.; washed smalls, 11s. to 11s. 6d.; rough slack, 9s. 6d. to 10s. per ton. Yorkshire, Derbyshire and Nottinghamshire—Screened steam coal, 14s. to 14s. 6d.; gas coke, 21s. 3d. to 24s. 3d.; furnace coke, 17s. to 18s. per ton.

The trade in Lancashire is very quiet, and spot lots are being offered at low rates. Lancashire best house, 31s. to 32s.; seconds, 27s. to 28s.; common, 19s. to 21s.; kitchen, 22s. to 23s.; Yorkshire selected house, 31s. to 34s.; house coal, 26s. to 28s.; cobbles, 17s. to 20s.; washed doubles, 13s. to 14s.; washed singles, 12s. to 13s.; rough slack, 7s. 6d. to 9s. 6d. per ton in wagons at the pit.

MIDLANDS.

Nothing has occurred to relieve the dulness prevailing in every branch of the trade. The demand for house coal has shrunk to a very low level. There is nothing more favourable to say about the industrial consumption than has been said since last spring. Pits are working irregularly.

Developments are still awaited in connection with the control scheme originated in Yorkshire, Derbyshire, and Nottinghamshire. It is intimated now that actual operations will not begin till April. Meanwhile, there are no market movements that can be ascribed to the projected adoption of a unified policy.

In a few directions slacks and smalls seem to show a rather firmer tendency as a result of the general curtailment of output. The consumption of those descriptions of fuel is not so much out of proportion, however, as to involve any widespread stringency. Slacks have been obtainable round about 6s. to 6s. 6d., and D.S. nuts at 11s. and even less.

Blast-furnace coke is in no better demand in the Midlands. The usual price is about 12s. at ovens. Where there has been a pressure to sell, cokemen have made a further small concession, though instances of this are rare.

Those gas undertakings which have not arranged for their supplies over the coming year are now in negotiation with collieries. Contract prices rule at 6d. to 1s. below the rates of last summer; but in the case of buyers who fixed up a year ago, before the market had ebbed, the difference is naturally greater.

"A Guide to Efficiency."—This is the title of an excellent booklet prepared by the Mossley Gas Department for their consumers. It points out the advisability of reading meters regularly, to check waste, and it contains several useful gas cooker hints. An interesting feature is a table of equivalents for weighing and measuring cooking ingredients. The price of gas at Mossley is very low.

European Gas Company, Ltd.

In the report covering the year 1927, which they will submit to the shareholders at the annual meeting next Tuesday (March 13), the Directors state that, after providing for all charges, the profit on the year's operations amounts to £61,768. An interim dividend at the rate of 4s. per share was paid in October last, absorbing £50,043; and the Directors now recommend that a final dividend of 6s. per share be paid, making a total of 10s. per share, or 5 p.c. for the year, free of income-tax, and that the balance of £11,659 be carried to general revenue, to which the balance of £355 from 1926 was duly transferred. French Exchange has remained practically stationary in the neighbourhood of 124 frs. to the pound sterling. Owing partly to the slackening of trade and industry in France, and partly to an alteration in the system of meter reading, which has resulted in an apparent loss of consumption, the quantity of gas sold shows a decrease of 4·85 p.c. The number of consumers has, however, risen from 145,410 to 147,239—an increase of 1829 in the year, or at the rate of 1·26 p.c. Notwithstanding the work which has been carried out since the war, the percentage of unaccounted-for gas still remains unduly high; and the repair and replacement of defective mains must therefore be continued methodically. The works and plant in France have been duly maintained. Considerable progress has been made with the construction of a gasholder on the site of the new works at Roche Maurice, Nantes, and with the laying of the connecting main thence to the existing governor house. An auxiliary plant on the Strache system is being installed, to cope with the growing consumption until such time as the new works have been built. With a view to economies in manufacture, the small station at Wimereux has been shut-down; and this district is now supplied from Boulogne. At Caen a new bench of retorts is in course of erection; and a contract has been concluded for the supply of gas until Dec. 31, 1956, to the outlying Commune of Bretteville-sur-Odon.

Grays and Tilbury Gas Company.—The Directors of the Company have authorized Messrs. A. & W. Richards to offer for sale by tender £10,000 5 p.ct. perpetual debenture stock (minimum price of issue £92 per £100), and 2000 £10 "B" ordinary shares ranking for a standard dividend of 7 p.ct. (minimum price of issue £10 per share). Tenders should reach Messrs. Richards, at 37, Walbrook, E.C. 4, not later than 11 o'clock on Thursday, March 22.

Canterbury Stock Issue.—Messrs. A. & W. Richards have been instructed by the Directors to invite tenders for £15.000 of new "B" ordinary stock and £10,000 of redeemable mortgages in the water undertaking of the Canterbury Gas and Water Company. The ordinary stock is entitled to a maximum dividend of 8 p.ct.; and the minimum price of issue is £133 per £100 of stock. The mortgages will be allotted to persons offering to lend the money at the lowest rates of interest; the maximum rate which will be accepted being 5½ p.ct. per annum. Tenders must be sent to Messrs. Richards at 37, Walbrook, E.C., by Thursday morning, March 8.

Wellington (N.Z.) Gas Company, Ltd.—In their report for the year 1927 the Directors state that the results obtained from the Glover-West vertical retort plant continue to be satisfactory, and the erection of the second unit is now completed. Some 23 miles of new mains have been laid, and 1397 services connected. There has again been a satisfactory increase in the consumption of gas. During the year the rise in the price of coal increased the cost of gas manufacture. The price of gas has, however, been reduced 2d. per 1000 c.ft. from Jan. 1 of this year. The dividend for the twelve months is 8 p.ct.; and there is a balance of £24,412 to be carried forward.

Staff Lectures at Sheffield.—During each winter season since 1923 a series of lectures has been given to the outdoor staff of the Sheffield Gas Company. These have been held at the chief showrooms, 15-17, High Street, and have proved most instructive. They are to be recommended as a means of increasing knowledge and efficiency. During the past winter, subjects have been dealt with by members of the staff, including "Indoor and Outdoor Sales," "Construction and Operation of Dry Meters," and "Pipe Fitting on the District." Through the courtesy of Messrs. Ewart & Son, Ltd., London, the staff of the Sheffield Gas Company were addressed by Mr. Geo. Ewart on the evening of Feb. 23; his subject being "Hot Water." Mr. Ewart confined his remarks principally to the construction and use of gas geysers, and the correct methods of fixing. His remarks were followed with great interest, and evoked an excellent discussion.

Some opposition is forthcoming at Dartmouth to the local Gas Company's proposal, which has been sanctioned by the Town Council, to erect a permanent coal transporter over the Embankment, for the more efficient and economical discharge of coal from vessels into their stores. The work is done at present by hand and crane; and perhaps because it will result in the employment of less labour, the Transport Workers' Union are promoting a petition against the erection of the transporter.

"Accidental death" was the verdict returned at a Blackburn inquest on John Thomas Wignall, of Blackburn, who was overcome by gas fumes while working on a gas main. The evidence showed that Wignall was opening a plug hole some distance from where the new main was to be laid on the Brownhill housing site, and inserted into the main a rubber bladder which could be blown up by the mouth. He had tried to do this without getting another length of pipe. He was working alone in the trench 18 in. deep, and apparently was affected by gas fumes immediately he removed the plug. A foreman mainlayer said it was usual when this work was being done for two men to work together.